SEQUENCE LISTING

<110> Neo-Morgan Laboratories Inc.
FURUSAWA, Mitsuru

<120> Method and system for rapidly conferring a desired trait to an organism

<130> NE0001PCT

<150> JP 2003-92898
<150> 2003-3-28

<150> US 10/684,141
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<170> PatentIn Ver. 2.1

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catctgaatg tgaaaaatcc ccttctagaa cttgtcaaat cactctgcca tgtcatgtta 6780
ctttcaaaga gtacaatttt agaaatcagg accctgagaa aagaactgct gaagatattt 6840
gaattgcgtg agtttgctaa agtagcggaa ttcaaagatc caagtttgag tctcgtggtg 6900
ccggattttt tatgtgaata ctgtttttc atttctgata ttgacttttg taaggcagct 6960
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gaacacctga ttcaaaaact acgttctgat atcgaatcct atttaattca agatttgaga 7080
tgctccagat gtcataaagt gaaacgtgac tatatgagtg cccactgtcc atgtgccggc 7140
gcgtgggaag gaactctccc cagagaaagc attgttcaaa agttaaatgt gtttaagcaa 7200
gtagccaagt attacggttt tgatatatta ttgagttgta ttgctgattt gaccatatga 7260
gtaagcagta tataacgcga ggttcaatgg cctctttacc atgaaaaaaa aaaaaaaaaa 7320
aaaaaaaagg taaggaaaaa gagtattttc aattcgtttc tgaacatata aatataaata 7380
accgaaaaat tagcccttga acataattaa cactcttctt tgatatttaa atcacaagta 7440
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gttgc 7505

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<211> 2222
<212> PRT
<213> Saccharomyces cerevisiae

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Tyr Ser Ala Gly Asn Lys Tyr Asn Thr Leu Ser Asn Asn Tyr Ala Leu
20 25 30

Ser Ala Gln Gln Leu Leu Asn Ala Ser Lys Ile Asp Asp Ile Asp Ser
35 40 45

Met Met Gly Phe Glu Arg Tyr Val Pro Pro Gln Tyr Asn Gly Arg Phe
50 55 60

Asp Ala Lys Asp Ile Asp Gln Ile Pro Gly Arg Val Gly Trp Leu Thr
65 70 75 80

Asn Met His Ala Thr Leu Val Ser Gln Glu Thr Leu Ser Ser Gly Ser
85 90 95

Asn Gly Gly Gly Asn Ser Asn Asp Gly Glu Arg Val Thr Thr Asn Gln
100 105 110

Gly Ile Ser Gly Val Asp Phe Tyr Phe Leu Asp Glu Glu Gly Gly Ser
115 120 125

Phe Lys Ser Thr Val Val Tyr Asp Pro Tyr Phe Phe Ile Ala Cys Asn
130 135 140

Asp Glu Ser Arg Val Asn Asp Val Glu Glu Leu Val Lys Lys Tyr Leu
145 150 155 160

Glu Ser Cys Leu Lys Ser Leu Gln Ile Ile Arg Lys Glu Asp Leu Thr
165 170 175

Met Asp Asn His Leu Leu Gly Leu Gln Lys Thr Leu Ile Lys Leu Ser
180 185 190

Phe Val Asn Ser Asn Gln Leu Phe Glu Ala Arg Lys Leu Leu Arg Pro
195 200 205

Ile Leu Gln Asp Asn Ala Asn Asn Asn Val Gln Arg Asn Ile Tyr Asn
210 215 220

Val Ala Ala Asn Gly Ser Glu Lys Val Asp Ala Lys His Leu Ile Glu
225 230 235 240

Asp Ile Arg Glu Tyr Asp Val Pro Tyr His Val Arg Val Ser Ile Asp
245 250 255

Lys Asp Ile Arg Val Gly Lys Trp Tyr Lys Val Thr Gln Gln Gly Phe
260 265 270

Ile Glu Asp Thr Arg Lys Ile Ala Phe Ala Asp Pro Val Val Met Ala
275 280 285

Phe Asp Ile Glu Thr Thr Lys Pro Pro Leu Lys Phe Pro Asp Ser Ala
290 295 300

Val Asp Gln Ile Met Met Ile Ser Tyr Met Ile Asp Gly Glu Gly Phe
305 310 315 320

Leu Ile Thr Asn Arg Glu Ile Ile Ser Glu Asp Ile Glu Asp Phe Glu
325 330 335

Tyr Thr Pro Lys Pro Glu Tyr Pro Gly Phe Phe Thr Ile Phe Asn Glu
340 345 350

Asn Asp Glu Val Ala Leu Leu Gln Arg Phe Phe Glu His Ile Arg Asp
355 360 365

Val Arg Pro Thr Val Ile Ser Thr Phe Asn Gly Asp Phe Phe Asp Trp
370 375 380

Pro Phe Ile His Asn Arg Ser Lys Ile His Gly Leu Asp Met Phe Asp
385 390 395 400

Glu Ile Gly Phe Ala Pro Asp Ala Glu Gly Glu Tyr Lys Ser Ser Tyr
405 410 415

Cys Ser His Met Asp Cys Phe Arg Trp Val Lys Arg Asp Ser Tyr Leu
420 425 430

Pro Gln Gly Ser Gln Gly Leu Lys Ala Val Thr Gln Ser Lys Leu Gly
435 440 445

Tyr Asn Pro Ile Glu Leu Asp Pro Glu Leu Met Thr Pro Tyr Ala Phe
450 455 460

Glu Lys Pro Gln His Leu Ser Glu Tyr Ser Val Ser Asp Ala Val Ala
465 470 475 480

Thr Tyr Tyr Leu Tyr Met Lys Tyr Val His Pro Phe Ile Phe Ser Leu
485 490 495

Cys Thr Ile Ile Pro Leu Asn Pro Asp Glu Thr Leu Arg Lys Gly Thr
500 505 510

Gly Thr Leu Cys Glu Met Leu Leu Met Val Gln Ala Tyr Gln His Asn
515 520 525

Ile Leu Leu Pro Asn Lys His Thr Asp Pro Ile Glu Arg Phe Tyr Asp
530 535 540

Gly His Leu Leu Glu Ser Glu Thr Tyr Val Gly Gly His Val Glu Ser
545 550 555 560

Leu Glu Ala Gly Val Phe Arg Ser Asp Leu Lys Asn Glu Phe Lys Ile
565 570 575

Asp Pro Ser Ala Ile Asp Glu Leu Leu Gln Glu Leu Pro Glu Ala Leu
580 585 590

Lys Phe Ser Val Glu Val Glu Asn Lys Ser Ser Val Asp Lys Val Thr

595 600 605

Asn Phe Glu Glu Ile Lys Asn Gln Ile Thr Gln Lys Leu Leu Glu Leu
610 615 620

Lys Glu Asn Asn Ile Arg Asn Glu Leu Pro Leu Ile Tyr His Val Asp
625 630 635 640

Val Ala Ser Met Tyr Pro Asn Ile Met Thr Thr Asn Arg Leu Gln Pro
645 650 655

Asp Ser Ile Lys Ala Glu Arg Asp Cys Ala Ser Cys Asp Phe Asn Arg
660 665 670

Pro Gly Lys Thr Cys Ala Arg Lys Leu Lys Trp Ala Trp Arg Gly Glu
675 680 685

Phe Phe Pro Ser Lys Met Asp Glu Tyr Asn Met Ile Lys Arg Ala Leu
690 695 700

Gln Asn Glu Thr Phe Pro Asn Lys Asn Lys Phe Ser Lys Lys Lys Val
705 710 715 720

Leu Thr Phe Asp Glu Leu Ser Tyr Ala Asp Gln Val Ile His Ile Lys
725 730 735

Lys Arg Leu Thr Glu Tyr Ser Arg Lys Val Tyr His Arg Val Lys Val
740 745 750

Ser Glu Ile Val Glu Arg Glu Ala Ile Val Cys Gln Arg Glu Asn Pro
755 760 765

Phe Tyr Val Asp Thr Val Lys Ser Phe Arg Asp Arg Arg Tyr Glu Phe
770 775 780

Lys Gly Leu Ala Lys Thr Trp Lys Gly Asn Leu Ser Lys Ile Asp Pro
785 790 795 800

Ser Asp Lys His Ala Arg Asp Glu Ala Lys Lys Met Ile Val Leu Tyr
805 810 815

Asp Ser Leu Gln Leu Ala His Lys Val Ile Leu Asn Ser Phe Tyr Gly
820 825 830

Tyr Val Met Arg Lys Gly Ser Arg Trp Tyr Ser Met Glu Met Ala Gly
835 840 845

Ile Thr Cys Leu Thr Gly Ala Thr Ile Ile Gln Met Ala Arg Ala Leu
850 855 860

Val Glu Arg Val Gly Arg Pro Leu Glu Leu Asp Thr Asp Gly Ile Trp
865 870 875 880

Cys Ile Leu Pro Lys Ser Phe Pro Glu Thr Tyr Phe Phe Thr Leu Glu
885 890 895

Asn Gly Lys Lys Leu Tyr Leu Ser Tyr Pro Cys Ser Met Leu Asn Tyr
900 905 910

Arg Val His Gln Lys Phe Thr Asn His Gln Tyr Gln Glu Leu Lys Asp
915 920 925

Pro Leu Asn Tyr Ile Tyr Glu Thr His Ser Glu Asn Thr Ile Phe Phe
930 935 940

Glu Val Asp Gly Pro Tyr Lys Ala Met Ile Leu Pro Ser Ser Lys Glu
945 950 955 960

Glu Gly Lys Gly Ile Lys Lys Arg Tyr Ala Val Phe Asn Glu Asp Gly
965 970 975

Ser Leu Ala Glu Leu Lys Gly Phe Glu Leu Lys Arg Arg Gly Glu Leu
980 985 990

Gln Leu Ile Lys Asn Phe Gln Ser Asp Ile Phe Lys Val Phe Leu Glu
995 1000 1005

Gly Asp Thr Leu Glu Gly Cys Tyr Ser Ala Val Ala Ser Val Cys Asn
1010 1015 1020

Arg Trp Leu Asp Val Leu Asp Ser His Gly Leu Met Leu Glu Asp Glu
1025 1030 1035 1040

Asp Leu Val Ser Leu Ile Cys Glu Asn Arg Ser Met Ser Lys Thr Leu
1045 1050 1055

Lys Glu Tyr Glu Gly Gln Lys Ser Thr Ser Ile Thr Thr Ala Arg Arg
1060 1065 1070

Leu Gly Asp Phe Leu Gly Glu Asp Met Val Lys Asp Lys Gly Leu Gln
1075 1080 1085

Cys Lys Tyr Ile Ile Ser Ser Lys Pro Phe Asn Ala Pro Val Thr Glu
1090 1095 1100

Arg Ala Ile Pro Val Ala Ile Phe Ser Ala Asp Ile Pro Ile Lys Arg
1105 1110 1115 1120

Ser Phe Leu Arg Arg Trp Thr Leu Asp Pro Ser Leu Glu Asp Leu Asp
1125 1130 1135

Ile Arg Thr Ile Ile Asp Trp Gly Tyr Tyr Arg Glu Arg Leu Gly Ser
1140 1145 1150

Ala Ile Gln Lys Ile Ile Thr Ile Pro Ala Ala Leu Gln Gly Val Ser
1155 1160 1165

Asn Pro Val Pro Arg Val Glu His Pro Asp Trp Leu Lys Arg Lys Ile
1170 1175 1180

Ala Thr Lys Glu Asp Lys Phe Lys Gln Thr Ser Leu Thr Lys Phe Phe

1185 1190 1195 1200

Ser Lys Thr Lys Asn Val Pro Thr Met Gly Lys Ile Lys Asp Ile Glu
1205 1210 1215

Asp Leu Phe Glu Pro Thr Val Glu Glu Asp Asn Ala Lys Ile Lys Ile
1220 1225 1230

Ala Arg Thr Thr Lys Lys Lys Ala Val Ser Lys Arg Lys Arg Asn Gln
1235 1240 1245

Leu Thr Asn Glu Glu Asp Pro Leu Val Leu Pro Ser Glu Ile Pro Ser
1250 1255 1260

Met Asp Glu Asp Tyr Val Gly Trp Leu Asn Tyr Gln Lys Ile Lys Trp
1265 1270 1275 1280

Lys Ile Gln Ala Arg Asp Arg Lys Arg Arg Asp Gln Leu Phe Gly Asn
1285 1290 1295

Thr Asn Ser Ser Arg Glu Arg Ser Ala Leu Gly Ser Met Ile Arg Lys
1300 1305 1310

Gln Ala Glu Ser Tyr Ala Asn Ser Thr Trp Glu Val Leu Gln Tyr Lys
1315 1320 1325

Asp Ser Gly Glu Pro Gly Val Leu Glu Val Phe Val Thr Ile Asn Gly
1330 1335 1340

Lys Val Gln Asn Ile Thr Phe His Ile Pro Lys Thr Ile Tyr Met Lys
1345 1350 1355 1360

Phe Lys Ser Gln Thr Met Pro Leu Gln Lys Ile Lys Asn Cys Leu Ile
1365 1370 1375

Glu Lys Ser Ser Ala Ser Leu Pro Asn Asn Pro Lys Thr Ser Asn Pro
1380 1385 1390

Ala Gly Gly Gln Leu Phe Lys Ile Thr Leu Pro Glu Ser Val Phe Leu
1395 1400 1405

Glu Glu Lys Glu Asn Cys Thr Ser Ile Phe Asn Asp Glu Asn Val Leu
1410 1415 1420

Gly Val Phe Glu Gly Thr Ile Thr Pro His Gln Arg Ala Ile Met Asp
1425 1430 1435 1440

Leu Gly Ala Ser Val Thr Phe Arg Ser Lys Ala Met Gly Ala Leu Gly
1445 1450 1455

Lys Gly Ile Gln Gln Gly Phe Glu Met Lys Asp Leu Ser Met Ala Glu
1460 1465 1470

Asn Glu Arg Tyr Leu Ser Gly Phe Ser Met Asp Ile Gly Tyr Leu Leu
1475 1480 1485

His Phe Pro Thr Ser Ile Gly Tyr Glu Phe Phe Ser Leu Phe Lys Ser
1490 1495 1500

Trp Gly Asp Thr Ile Thr Ile Leu Val Leu Lys Pro Ser Asn Gln Ala
1505 1510 1515 1520

Gln Glu Ile Asn Ala Ser Ser Leu Gly Gln Ile Tyr Lys Gln Met Phe
1525 1530 1535

Glu Lys Lys Lys Gly Lys Ile Glu Thr Tyr Ser Tyr Leu Val Asp Ile
1540 1545 1550

Lys Glu Asp Ile Asn Phe Glu Phe Val Tyr Phe Thr Asp Ile Ser Lys
1555 1560 1565

Leu Tyr Arg Arg Leu Ser Gln Glu Thr Thr Lys Leu Lys Glu Glu Arg
1570 1575 1580

Gly Leu Gln Phe Leu Leu Leu Leu Gln Ser Pro Phe Ile Thr Lys Leu
1585 1590 1595 1600

Leu Gly Thr Ile Arg Leu Leu Asn Gln Met Pro Ile Val Lys Leu Ser
1605 1610 1615

Leu Asn Glu Val Leu Leu Pro Gln Leu Asn Trp Gln Pro Thr Leu Leu
1620 1625 1630

Lys Lys Leu Val Asn His Val Leu Ser Ser Gly Ser Trp Ile Ser His
1635 1640 1645

Leu Ile Lys Leu Ser Gln Tyr Ser Asn Ile Pro Ile Cys Asn Leu Arg
1650 1655 1660

Leu Asp Ser Met Asp Tyr Ile Ile Asp Val Leu Tyr Ala Arg Lys Leu
1665 1670 1675 1680

Lys Lys Glu Asn Ile Val Leu Trp Trp Asn Glu Lys Ala Pro Leu Pro
1685 1690 1695

Asp His Gly Gly Ile Gln Asn Asp Phe Asp Leu Asn Thr Ser Trp Ile
1700 1705 1710

Met Asn Asp Ser Glu Phe Pro Lys Ile Asn Asn Ser Gly Val Tyr Asp
1715 1720 1725

Asn Val Val Leu Asp Val Gly Val Asp Asn Leu Thr Val Asn Thr Ile
1730 1735 1740

Leu Thr Ser Ala Leu Ile Asn Asp Ala Glu Gly Ser Asp Leu Val Asn
1745 1750 1755 1760

Asn Asn Met Gly Ile Asp Asp Lys Asp Ala Val Ile Asn Ser Pro Ser
1765 1770 1775

Glu Phe Val His Asp Ala Phe Ser Asn Asp Ala Leu Asn Val Leu Arg

1780 1785 1790

Gly Met Leu Lys Glu Trp Trp Asp Glu Ala Leu Lys Glu Asn Ser Thr
1795 1800 1805

Ala Asp Leu Leu Val Asn Ser Leu Ala Ser Trp Val Gln Asn Pro Asn
1810 1815 1820

Ala Lys Leu Phe Asp Gly Leu Leu Arg Tyr His Val His Asn Leu Thr
1825 1830 1835 1840

Lys Lys Ala Leu Leu Gln Leu Val Asn Glu Phe Ser Ala Leu Gly Ser
1845 1850 1855

Thr Ile Val Tyr Ala Asp Arg Asn Gln Ile Leu Ile Lys Thr Asn Lys
1860 1865 1870

Tyr Ser Pro Glu Asn Cys Tyr Ala Tyr Ser Gln Tyr Met Met Lys Ala
1875 1880 1885

Val Arg Thr Asn Pro Met Phe Ser Tyr Leu Asp Leu Asn Ile Lys Arg
1890 1895 1900

Tyr Trp Asp Leu Leu Ile Trp Met Asp Lys Phe Asn Phe Ser Gly Leu
1905 1910 1915 1920

Ala Cys Ile Glu Ile Glu Glu Lys Glu Asn Gln Asp Tyr Thr Ala Val
1925 1930 1935

Ser Gln Trp Gln Leu Lys Lys Phe Leu Ser Pro Ile Tyr Gln Pro Glu
1940 1945 1950

Phe Glu Asp Trp Met Met Ile Ile Leu Asp Ser Met Leu Lys Thr Lys
1955 1960 1965

Gln Ser Tyr Leu Lys Leu Asn Ser Gly Thr Gln Arg Pro Thr Gln Ile
1970 1975 1980

Val Asn Val Lys Lys Gln Asp Lys Glu Asp Ser Val Glu Asn Ser Leu
1985 1990 1995 2000

Asn Gly Phe Ser His Leu Phe Ser Lys Pro Leu Met Lys Arg Val Lys
2005 2010 2015

Lys Leu Phe Lys Asn Gln Gln Glu Phe Ile Leu Asp Pro Gln Tyr Glu
2020 2025 2030

Ala Asp Tyr Val Ile Pro Val Leu Pro Gly Ser His Leu Asn Val Lys
2035 2040 2045

Asn Pro Leu Leu Glu Leu Val Lys Ser Leu Cys His Val Met Leu Leu
2050 2055 2060

Ser Lys Ser Thr Ile Leu Glu Ile Arg Thr Leu Arg Lys Glu Leu Leu
2065 2070 2075 2080

Lys Ile Phe Glu Leu Arg Glu Phe Ala Lys Val Ala Glu Phe Lys Asp
2085 2090 2095

Pro Ser Leu Ser Leu Val Val Pro Asp Phe Leu Cys Glu Tyr Cys Phe
2100 2105 2110

Phe Ile Ser Asp Ile Asp Phe Cys Lys Ala Ala Pro Glu Ser Ile Phe
2115 2120 2125

Ser Cys Val Arg Cys His Lys Ala Phe Asn Gln Val Leu Leu Gln Glu
2130 2135 2140

His Leu Ile Gln Lys Leu Arg Ser Asp Ile Glu Ser Tyr Leu Ile Gln
2145 2150 2155 2160

Asp Leu Arg Cys Ser Arg Cys His Lys Val Lys Arg Asp Tyr Met Ser
2165 2170 2175

Ala His Cys Pro Cys Ala Gly Ala Trp Glu Gly Thr Leu Pro Arg Glu
2180 2185 2190

Ser Ile Val Gln Lys Leu Asn Val Phe Lys Gln Val Ala Lys Tyr Tyr
2195 2200 2205

Gly Phe Asp Ile Leu Leu Ser Cys Ile Ala Asp Leu Thr Ile
2210 2215 2220

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<213> Escherichia coli

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1 5 10

<210> 6
<211> 12
<212> PRT
<213> Haemophilus influenzae

<400> 6
Gln Ile Val Leu Asp Thr Glu Thr Thr Gly Met Asn
1 5 10

<210> 7
<211> 12
<212> PRT
<213> Salmonella typhimurium

<400> 7
Gln Ile Val Leu Asp Thr Glu Thr Thr Gly Met Asn
1 5 10

<210> 8
<211> 12
<212> PRT
<213> Vibrio cholerae

<400> 8
Ile Val Val Leu Asp Thr Glu Thr Thr Gly Met Asn
1 5 10

<210> 9
<211> 12
<212> PRT
<213> Pseudomonas aeruginosa

<400> 9
Ser Val Val Leu Asp Thr Glu Thr Thr Gly Met Pro
1 5 10

<210> 10
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<212> PRT
<213> Neisseria meningitidis

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Gln Ile Ile Leu Asp Thr Glu Thr Thr Gly Leu Tyr
1 5 10

<210> 11

<211> 12
<212> PRT
<213> Chlamydia trachomatis

<400> 11
Phe Val Cys Leu Asp Cys Glu Thr Thr Gly Leu Asp
1 5 10

<210> 12
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<212> PRT
<213> Streptomyces coelicolor

<400> 12
Leu Ala Ala Phe Asp Thr Glu Thr Thr Gly Val Asp
1 5 10

<210> 13
<211> 12
<212> PRT
<213> Shigella flexneri 2a str. 301

<400> 13
Gln Ile Val Leu Asp Thr Glu Thr Thr Gly Met Asn
1 5 10

<210> 14
<211> 12
<212> PRT
<213> Staphylococcus aureus

<400> 14
Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser
1 5 10

<210> 15
<211> 12
<212> PRT
<213> Bacillus subtilis

<400> 15
Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser
1 5 10

<210> 16
<211> 12
<212> PRT
<213> Mycoplasma pulmonis

<400> 16
Tyr Val Val Tyr Asp Ile Glu Thr Thr Gly Leu Ser
1 5 10

<210> 17
<211> 12
<212> PRT
<213> Mycoplasma genitalium

<400> 17
Phe Val Ile Phe Asp Ile Glu Thr Thr Gly Leu His
1 5 10

<210> 18
<211> 12
<212> PRT
<213> Mycoplasma pneumoniae

<400> 18
Phe Val Ile Phe Asp Ile Glu Thr Thr Gly Leu His
1 5 10

<210> 19
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<212> PRT
<213> Saccharomyces cerevisiae

<400> 19
Ile Met Ser Phe Asp Ile Glu Cys Ala Gly Arg Ile
1 5 10

<210> 20
<211> 12
<212> PRT
<213> Saccharomyces cerevisiae

<400> 20
Val Met Ala Phe Asp Ile Glu Thr Thr Lys Pro Pro
1 5 10

<210> 21
<211> 12
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<213> Mus musculus

<400> 21
Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 22
<211> 12

<212> PRT
<213> Mus musculus

<400> 22
Val Leu Ala Phe Asp Ile Glu Thr Thr Lys Leu Pro
1 5 10

<210> 23
<211> 12
<212> PRT
<213> Homo sapiens

<400> 23
Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 24
<211> 12
<212> PRT
<213> Homo sapiens

<400> 24
Val Leu Ala Phe Asp Ile Glu Thr Thr Lys Leu Pro
1 5 10

<210> 25
<211> 12
<212> PRT
<213> Oryza sativa

<400> 25
Ile Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 26
<211> 12
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<213> Arabidopsis thaliana

<400> 26
Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 27
<211> 12
<212> PRT
<213> Arabidopsis thaliana

<400> 27
Val Cys Ala Phe Asp Ile Glu Thr Val Lys Leu Pro
1 5 10

<210> 28
<211> 12
<212> PRT
<213> Rattus norvegicus

<400> 28
Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 29
<211> 12
<212> PRT
<213> Bos taurus

<400> 29

Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 30
<211> 12
<212> PRT
<213> Glycine max

<400> 30
Ile Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 31
<211> 12
<212> PRT
<213> Drosophila melanogaster

<400> 31
Ile Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys
1 5 10

<210> 32
<211> 12
<212> PRT
<213> Drosophila melanogaster

<400> 32
Val Leu Ala Phe Asp Ile Glu Thr Thr Lys Leu Pro
1 5 10

<210> 33
<211> 36
<212> DNA

<213> Artificial Sequence

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atcatgtcct ttgctatcgc ttgtgctggt aggatt 36

<210> 34
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Mutated pol delta

<400> 34
Ile Met Ser Phe Ala Ile Ala Cys Ala Gly Arg Ile
1 5 10

<210> 35
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Mutated pol epsilon

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gtaatggcat ttgctatagc taccacgaag ccgcct 36

<210> 36
<211> 7
<212> PRT

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Mutated pol epsilon

<400> 36
Val Met Ala Phe Ala Ile Ala Thr Thr Lys Pro Pro
1 5 10

<210> 37
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Primer

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CCCGAGCTCA TGAGTGAAAA AAGATCCCTT 30

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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Primer

<400> 38
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<210> 39
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<212> DNA

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Primer

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CCCGAGCTCA TGATGTTTGG CAAGAAAAAA 30

<210> 40
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Primer

<400> 40
CCCGCGGCCG CTCATATGGT CAAATCAGCA 30

<210> 41
<211> 1592
<212> DNA
<213> Escherichia coli

<400> 41
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ggtattcaac cgactgaact accgctccgc gttgtgttcc gttgggaacg aggcgaatag 180
ttacgaattg cctcgacctc gtcaacggtt tttctatctt ttgaatcgtt tgctgcaaaa 240
atcgcccaag tcgctatttt tagcgccttt cacaggtatt tatgctcgcc agaggcaact 300
tccgcctttc ttctgcacca gatcgagacg ggcttcatga gctgcaatct cttcatctgt 360
cgcaaaaaca acgcgtaact tacttgcctg acgtacaatg cgctgaattg ttgcttcacc 420
ttgttgctgt tgtgtctctc cttccatcgc aaaagccatc gacgtttgac caccggtcat 480
cgccagataa acttccgcaa ggatctgggc atcgagtaat gccccgtgca gcgttcgttt 540
actgttatct atttcgtagc gagcacataa cgcatcgagg ctgttgcgct taccgggaaa 600

cattttcctc gccaccgcaa ggctatcggt gaccttacag aaagtattgg tcttcggaat 660
atcgcgctta agcaacgaaa actcgtagtc cataaagccg atatcgaacg ctgcgttatg 720
gatcaccaac tccgcgccgc gaatatagtc catgaactca tcggctactt cggcaaacgt 780
gggcttatcg agcaaaaatt catcggcaat accatgtacg ccaaaggctt ccggatccac 840
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ttcaacggca ccaatctcaa tgatcttgtg gccttcatag tgcgcaccaa tctggttcat 960
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taaacaggta gaaattttca ccgatggttc gtgtctgggc aatccaggac ctgggggtta 1140
cggcgctatt ttacgctatc gcggacgcga gaaaaccttt agcgctggct acacccgcac 1200
caccaacaac cgtatggagt tgatggccgc tattgtcgcg ctggaggcgt taaaagaaca 1260
ttgcgaagtc attttgagta ccgacagcca gtatgtccgc cagggtatca cccagtggat 1320
ccataactgg aaaaaacgtg gctggaaaac cgcagacaaa aaaccagtaa aaaatgtcga 1380
tctctggcaa cgtcttgatg ctgcattggg gcagcatcaa atcaaatggg aatgggttaa 1440
aggccatgcc ggacacccgg aaaacgaacg ctgtgatgaa ctggctcgtg ccgcggcgat 1500
gaatcccaca ctggaagata caggctacca agttgaagtt taagcctgtg gtttacgaca 1560
ttgccgggtg gctccaaccg cctagcgaat tc 1592

<210> 42
<211> 243
<212> PRT
<213> Escherichia coli

<400> 42
Met Ser Thr Ala Ile Thr Arg Gln Ile Val Leu Asp Thr Glu Thr Thr
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Gly Met Asn Gln Ile Gly Ala His Tyr Glu Gly His Lys Ile Ile Glu
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Ile Gly Ala Val Glu Val Val Asn Arg Arg Leu Thr Gly Asn Asn Phe
35 40 45

His Val Tyr Leu Lys Pro Asp Arg Leu Val Asp Pro Glu Ala Phe Gly
50 55 60

Val His Gly Ile Ala Asp Glu Phe Leu Leu Asp Lys Pro Thr Phe Ala
65 70 75 80

Glu Val Ala Asp Glu Phe Met Asp Tyr Ile Arg Gly Ala Glu Leu Val
85 90 95

Ile His Asn Ala Ala Phe Asp Ile Gly Phe Met Asp Tyr Glu Phe Ser
100 105 110

Leu Leu Lys Arg Asp Ile Pro Lys Thr Asn Thr Phe Cys Lys Val Thr
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Asp Ser Leu Ala Val Ala Arg Lys Met Phe Pro Gly Lys Arg Asn Ser
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Ala Met Thr Gly Gly Gln Thr Ser Met Ala Phe Ala Met Glu Gly Glu
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Thr Gln Gln Gln Gln Gly Glu Ala Thr Ile Gln Arg Ile Val Arg Gln
195 200 205

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<213> Bacillus subtilis

<400> 44

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Glu Ile Lys Lys Leu Thr Ile His Lys Ala Ser Lys Ser Trp His Phe
35 40 45

His Phe Gln Phe Lys Ser Leu Leu Pro Phe Gln Ile Tyr Asp Thr Leu
50 55 60

Thr Thr Arg Leu Thr Gln Ser Phe Ala His Ile Ala Lys Val Thr Ser
65 70 75 80

Ser Ile Glu Val Gln Asp Ala Glu Val Ser Glu Ser Ile Val Gln Asp
85 90 95

Tyr Trp Ser Arg Cys Ile Glu Glu Leu Gln Gly Ile Ser Pro Pro Ile
100 105 110

Ile Ser Leu Leu Asn Gln Gln Lys Pro Lys Leu Lys Gly Asn Lys Leu
115 120 125

Ile Val Lys Thr Lys Thr Asp Thr Glu Ala Ala Ala Leu Lys Asn Lys
130 135 140

Tyr Ser Ser Met Ile Gln Ala Glu Tyr Arg Gln Phe Gly Phe Pro Asp
145 150 155 160

Leu Gln Leu Asp Ala Glu Ile Phe Val Ser Glu Gln Glu Val Gln Lys
165 170 175

Phe Arg Glu Gln Lys Leu Ala Glu Asp Gln Glu Arg Ala Met Gln Ala
180 185 190

Leu Ile Glu Met Glu Lys Lys Asp Lys Glu Ser Asp Glu Asp Gln Ala
195 200 205

Pro Ser Gly Pro Leu Val Ile Gly Tyr Gln Ile Lys Asp Asn Glu Glu
210 215 220

Ile Arg Thr Leu Asp Ser Ile Met Asp Glu Glu Arg Arg Ile Thr Val
225 230 235 240

Gln Gly Tyr Val Phe Asp Val Glu Thr Arg Glu Leu Lys Ser Gly Arg
245 250 255

Thr Leu Cys Ile Phe Lys Ile Thr Asp Tyr Thr Asn Ser Ile Leu Ile
260 265 270

Lys Met Phe Ala Arg Glu Lys Glu Asp Ala Ala Leu Met Lys Ser Leu

275 280 285

Lys Lys Gly Met Trp Val Lys Ala Arg Gly Ser Ile Gln Asn Asp Thr
290 295 300

Phe Val Arg Asp Leu Val Met Ile Ala Asn Asp Val Asn Glu Ile Lys
305 310 315 320

Ala Lys Thr Arg Glu Asp Ser Ala Pro Glu Gly Glu Lys Arg Val Glu
325 330 335

Leu His Leu His Ser Pro Met Ser Gln Met Asp Ala Val Thr Gly Ile
340 345 350

Gly Lys Leu Val Glu Gln Ala Lys Lys Trp Gly His Glu Ala Ile Ala
355 360 365

Leu Thr Asp His Ala Val Val Gln Ser Phe Pro Asp Ala Tyr Ser Ala
370 375 380

Ala Lys Lys His Gly Ile Lys Met Ile Tyr Gly Met Glu Ala Asn Leu
385 390 395 400

Val Asp Asp Gly Val Pro Ile Ala Tyr Asn Ala Ala His Arg Leu Leu
405 410 415

Glu Glu Glu Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser
420 425 430

Ala Val Tyr Asp Thr Ile Ile Glu Leu Ala Ala Val Lys Val Lys Gly
435 440 445

Gly Glu Ile Ile Asp Lys Phe Glu Ala Phe Ala Asn Pro His Arg Pro
450 455 460

Leu Ser Ala Thr Ile Ile Glu Leu Thr Gly Ile Thr Asp Asp Met Leu
465 470 475 480

Gln Asp Ala Pro Asp Val Val Asp Val Ile Arg Asp Phe Arg Glu Trp
485 490 495

Ile Gly Asp Asp Ile Leu Val Ala His Asn Ala Ser Phe Asp Met Gly
500 505 510

Phe Leu Asn Val Ala Tyr Lys Lys Leu Leu Glu Val Glu Lys Ala Lys
515 520 525

Asn Pro Val Ile Asp Thr Leu Glu Leu Gly Arg Phe Leu Tyr Pro Glu
530 535 540

Phe Lys Asn His Arg Leu Asn Thr Leu Cys Lys Lys Phe Asp Ile Glu
545 550 555 560

Leu Thr Gln His His Arg Ala Ile Tyr Asp Thr Glu Ala Thr Ala Tyr
565 570 575

Leu Leu Leu Lys Met Leu Lys Asp Ala Ala Glu Lys Gly Ile Gln Tyr
580 585 590

His Asp Glu Leu Asn Glu Asn Met Gly Gln Ser Asn Ala Tyr Gln Arg
595 600 605

Ser Arg Pro Tyr His Ala Thr Leu Leu Ala Val Asn Ser Thr Gly Leu
610 615 620

Lys Asn Leu Phe Lys Leu Val Ser Leu Ser His Ile His Tyr Phe Tyr
625 630 635 640

Arg Val Pro Arg Ile Pro Arg Ser Gln Leu Glu Lys Tyr Arg Glu Gly
645 650 655

Leu Leu Ile Gly Ser Ala Cys Asp Arg Gly Glu Val Phe Glu Gly Met
660 665 670

Met Gln Lys Ser Pro Glu Glu Val Glu Asp Ile Ala Ser Phe Tyr Asp
675 680 685

Tyr Leu Glu Val Gln Pro Pro Glu Val Tyr Arg His Leu Leu Glu Leu
690 695 700

Glu Leu Val Arg Asp Glu Lys Ala Leu Lys Glu Ile Ile Ala Asn Ile
705 710 715 720

Thr Lys Leu Gly Glu Lys Leu Asn Lys Pro Val Val Ala Thr Gly Asn
725 730 735

Val His Tyr Leu Asn Asp Glu Asp Lys Ile Tyr Arg Lys Ile Leu Ile
740 745 750

Ser Ser Gln Gly Gly Ala Asn Pro Leu Asn Arg His Glu Leu Pro Lys
755 760 765

Val His Phe Arg Thr Thr Asp Glu Met Leu Glu Ala Phe Ser Phe Leu
770 775 780

Gly Glu Glu Lys Ala Lys Glu Ile Val Val Thr Asn Thr Gln Lys Val
785 790 795 800

Ala Ser Leu Val Asp Asp Ile Lys Pro Ile Lys Asp Asp Leu Tyr Thr
805 810 815

Pro Lys Ile Glu Gly Ala Asp Glu Glu Ile Arg Glu Met Ser Tyr Gln
820 825 830

Arg Ala Arg Ser Ile Tyr Gly Glu Glu Leu Pro Glu Ile Val Glu Ala
835 840 845

Arg Ile Glu Lys Glu Leu Lys Ser Ile Ile Gly His Gly Phe Ala Val
850 855 860

Ile Tyr Leu Ile Ser His Lys Leu Val Lys Arg Ser Leu Asp Asp Gly

865 870 875 880

Tyr Leu Val Gly Ser Arg Gly Ser Val Gly Ser Ser Leu Val Ala Thr
885 890 895

Leu Thr Glu Ile Thr Glu Val Asn Pro Leu Pro Pro His Tyr Val Cys
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Pro Glu Cys Gln His Ser Glu Phe Phe Asn Asp Gly Ser Val Gly Ser
915 920 925

Gly Phe Asp Leu Pro Asp Lys Thr Cys Pro His Cys Gly Thr Pro Leu
930 935 940

Lys Lys Asp Gly His Asp Ile Pro Phe Glu Thr Phe Leu Gly Phe Lys
945 950 955 960

Gly Asp Lys Val Pro Asp Ile Asp Leu Asn Phe Ser Gly Glu Tyr Gln
965 970 975

Pro Gln Ala His Asn Tyr Thr Lys Val Leu Phe Gly Glu Asp Asn Val
980 985 990

Tyr Arg Ala Gly Thr Ile Gly Thr Val Ala Glu Lys Thr Ala Tyr Gly
995 1000 1005

Tyr Val Lys Gly Tyr Ala Gly Asp Asn Asn Leu His Met Arg Gly Ala
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Glu Ile Asp Arg Leu Val Gln Gly Cys Thr Gly Val Lys Arg Thr Thr
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Gly Gln His Pro Gly Gly Ile Ile Val Val Pro Asp Tyr Met Asp Ile
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Tyr Asp Phe Ser Pro Ile Gln Phe Pro Ala Asp Ala Thr Gly Ser Glu
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Trp Lys Thr Thr His Phe Asp Phe His Ser Ile His Asp Asn Leu Leu
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1090 1095 1100

Gln Asp Leu Ser Gly Ile Asp Pro Lys Thr Ile Pro Thr Asp Asp Pro
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Glu Val Met Lys Ile Phe Gln Gly Thr Glu Ser Leu Gly Val Thr Glu
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Glu Gln Ile Gly Cys Lys Thr Gly Thr Leu Gly Ile Pro Glu Phe Gly
1140 1145 1150

Thr Arg Phe Val Arg Gln Met Leu Glu Asp Thr Lys Pro Thr Thr Phe
1155 1160 1165

Ser Glu Leu Val Gln Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp
1170 1175 1180

Leu Gly Asn Ala Gln Glu Leu Ile His Asn Asn Ile Cys Glu Leu Ser
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Glu Val Ile Gly Cys Arg Asp Asp Ile Met Val Tyr Leu Ile Tyr Gln
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Gly Leu Glu Pro Ser Leu Ala Phe Lys Ile Met Glu Phe Val Arg Lys
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Gly Lys Gly Leu Thr Pro Glu Trp Glu Glu Glu Met Lys Asn Asn Asn
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Val Pro Asp Trp Tyr Ile Asp Ser Cys Lys Lys Ile Lys Tyr Met Phe
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Pro Lys Ala His Ala Ala Ala Tyr Val Leu Met Ala Val Arg Ile Ala
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Tyr Phe Lys Val His His Ala Leu Leu Tyr Tyr Ala Ala Tyr Phe Thr
1285 1290 1295

Val Arg Ala Asp Asp Phe Asp Ile Asp Thr Met Ile Lys Gly Ser Thr
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Ala Ile Arg Ala Val Met Glu Asp Ile Asn Ala Lys Gly Leu Asp Ala
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Ser Pro Lys Glu Lys Asn Leu Leu Thr Val Leu Glu Leu Ala Leu Glu
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Met Cys Glu Arg Gly Tyr Ser Phe Gln Lys Val Asp Leu Tyr Arg Ser
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Ser Ala Thr Glu Phe Ile Ile Asp Gly Asn Ser Leu Ile Pro Pro Phe
1365 1370 1375

Asn Ser Ile Pro Gly Leu Gly Thr Asn Ala Ala Leu Asn Ile Val Lys
1380 1385 1390

Ala Arg Glu Glu Gly Glu Phe Leu Ser Lys Glu Asp Leu Gln Lys Arg
1395 1400 1405

Gly Lys Val Ser Lys Thr Ile Leu Glu Tyr Leu Asp Arg His Gly Cys
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Phe Leu Asp Glu Thr Leu Leu Tyr Gly Asp Glu Asp Glu Glu Ser Leu
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Ile Leu Arg Asp Ile Glu Glu Arg Glu Ser Arg Ser Ser Ala Trp Ala
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Arg Pro Pro Leu Ser Pro Ala Tyr Leu Ser Asn Ser Gln Ile Phe Gln
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Gln Leu Glu Ile Asp Ser Ile Ile Ala Glu Ser His Lys Glu Leu Leu
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Pro Gly Ser Ser Gly Gln Ala Pro Ile Ile Arg Met Phe Gly Val Thr
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Arg Glu Gly Asn Ser Val Cys Cys Phe Val His Gly Phe Glu Pro Tyr
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Phe Tyr Ile Ala Cys Pro Pro Gly Met Gly Pro Asp Asp Ile Ser Asn
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Phe His Gln Ser Leu Glu Gly Arg Met Arg Glu Ser Asn Lys Asn Ala
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Lys Val Pro Lys Phe Val Lys Arg Ile Glu Met Val Gln Lys Arg Ser
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Ile Met Tyr Tyr Gln Gln Gln Lys Ser Gln Thr Phe Leu Lys Ile Thr
195 200 205

Val Ala Leu Pro Thr Met Val Ala Ser Cys Arg Gly Ile Leu Asp Arg
210 215 220

Gly Leu Gln Ile Asp Gly Leu Gly Met Lys Ser Phe Gln Thr Tyr Glu
225 230 235 240

Ser Asn Ile Leu Phe Val Leu Arg Phe Met Val Asp Cys Asp Ile Val
245 250 255

Gly Gly Asn Trp Ile Glu Val Pro Thr Gly Lys Tyr Lys Lys Asn Ala
260 265 270

Arg Thr Leu Ser Tyr Cys Gln Leu Glu Phe His Cys Leu Tyr Ser Asp
275 280 285

Leu Ile Ser His Ala Ala Glu Gly Glu Tyr Ser Lys Met Ala Pro Phe
290 295 300

Arg Val Leu Ser Phe Asp Ile Glu Cys Ala Gly Arg Lys Gly His Phe
305 310 315 320

Pro Glu Ala Lys His Asp Pro Val Ile Gln Ile Ala Asn Leu Val Thr
325 330 335

Leu Gln Gly Glu Asp His Pro Phe Val Arg Asn Val Met Thr Leu Lys
340 345 350

Ser Cys Ala Pro Ile Val Gly Val Asp Val Met Ser Phe Glu Thr Glu
355 360 365

Arg Glu Val Leu Leu Ala Trp Arg Asp Leu Ile Arg Asp Val Asp Pro
370 375 380

Asp Ile Ile Ile Gly Tyr Asn Ile Cys Lys Phe Asp Leu Pro Tyr Leu
385 390 395 400

Ile Glu Arg Ala Ala Thr Leu Gly Ile Glu Glu Phe Pro Leu Leu Gly
405 410 415

Arg Val Lys Asn Ser Arg Val Arg Val Arg Asp Ser Thr Phe Ser Ser
420 425 430

Arg Gln Gln Gly Ile Arg Glu Ser Lys Glu Thr Thr Ile Glu Gly Arg
435 440 445

Phe Gln Phe Asp Leu Ile Gln Ala Ile His Arg Asp His Lys Leu Ser
450 455 460

Ser Tyr Ser Leu Asn Ser Val Ser Ala His Phe Leu Ser Glu Gln Lys
465 470 475 480

Glu Asp Val His His Ser Ile Ile Thr Asp Leu Gln Asn Gly Asn Ala
485 490 495

Glu Thr Arg Arg Arg Leu Ala Val Tyr Cys Leu Lys Asp Ala Tyr Leu
500 505 510

Pro Gln Arg Leu Leu Asp Lys Leu Met Phe Ile Tyr Asn Tyr Val Glu
515 520 525

Met Ala Arg Val Thr Gly Val Pro Ile Ser Phe Leu Leu Ala Arg Gly
530 535 540

Gln Ser Ile Lys Val Leu Ser Gln Leu Leu Arg Lys Gly Lys Gln Lys
545 550 555 560

Asn Leu Val Leu Pro Asn Ala Lys Gln Ser Gly Ser Glu Gln Gly Thr

565 570 575

Tyr Glu Gly Ala Thr Val Leu Glu Ala Arg Thr Gly Phe Tyr Glu Lys
580 585 590

Pro Ile Ala Thr Leu Asp Phe Ala Ser Leu Tyr Pro Ser Ile Met Met
595 600 605

Ala Tyr Asn Leu Cys Tyr Cys Thr Leu Val Thr Pro Glu Asp Val Arg
610 615 620

Lys Leu Asn Leu Pro Pro Glu His Val Thr Lys Thr Pro Ser Gly Glu
625 630 635 640

Thr Phe Val Lys Gln Thr Leu Gln Lys Gly Ile Leu Pro Glu Ile Leu
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Glu Glu Leu Leu Thr Ala Arg Lys Arg Ala Lys Ala Asp Leu Lys Glu
660 665 670

Ala Lys Asp Pro Leu Glu Lys Ala Val Leu Asp Gly Arg Gln Leu Ala
675 680 685

Leu Lys Ile Ser Ala Asn Ser Val Tyr Gly Phe Thr Gly Ala Thr Val
690 695 700

Gly Gln Leu Pro Cys Leu Glu Ile Ser Ser Ser Val Thr Ser Tyr Gly
705 710 715 720

Arg Gln Met Ile Glu Gln Thr Lys Lys Leu Val Glu Asp Lys Phe Thr
725 730 735

Thr Leu Gly Gly Tyr Gln Tyr Asn Ala Glu Val Ile Tyr Gly Asp Thr
740 745 750

Asp Ser Val Met Val Gln Phe Gly Val Ser Asp Val Glu Ala Ala Met

755 760 765

Thr Leu Gly Arg Glu Ala Ala Glu His Ile Ser Gly Thr Phe Ile Lys
770 775 780

Pro Ile Lys Leu Glu Phe Glu Lys Val Tyr Phe Pro Tyr Leu Leu Ile
785 790 795 800

Asn Lys Lys Arg Tyr Ala Gly Leu Leu Trp Thr Asn Pro Gln Gln Phe
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Asp Lys Met Asp Thr Lys Gly Ile Glu Thr Val Arg Arg Asp Asn Cys
820 825 830

Leu Leu Val Lys Asn Leu Val Thr Glu Ser Leu Asn Lys Ile Leu Ile
835 840 845

Asp Arg Asp Val Pro Gly Ala Ala Glu Asn Val Lys Lys Thr Ile Ser
850 855 860

Asp Leu Leu Met Asn Arg Ile Asp Leu Ser Leu Leu Val Ile Thr Lys
865 870 875 880

Gly Leu Thr Lys Thr Gly Asp Asp Tyr Glu Val Lys Ser Ala His Gly
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Glu Leu Ala Glu Arg Met Arg Lys Arg Asp Ala Ala Thr Ala Pro Asn
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Val Gly Asp Arg Val Pro Tyr Val Ile Ile Lys Ala Ala Lys Gly Ala
915 920 925

Lys Ala Tyr Glu Arg Ser Glu Asp Pro Ile Tyr Val Leu Gln Asn Asn
930 935 940

Ile Pro Ile Asp Pro Asn Tyr Tyr Leu Glu Asn Gln Ile Ser Lys Pro
945 950 955 960

Leu Leu Arg Ile Phe Glu Pro Val Leu Lys Asn Ala Ser Lys Glu Leu
965 970 975

Leu His Gly Ser His Thr Arg Ser Ile Ser Ile Thr Thr Pro Ser Asn
980 985 990

Ser Gly Ile Met Lys Phe Ala Lys Lys Gln Leu Ser Cys Val Gly Cys
995 1000 1005

Lys Val Pro Ile Arg Tyr Phe Val Gln Trp Asn Thr Met Arg Lys Leu
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Gln Gly Lys Arg Ser Arg Val Ile Leu Gln Lys Arg Val Ser Arg Tyr
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Ala Ala Trp Leu Ser Leu Lys Arg Phe Leu Gly Gly Cys Gly His Ser
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Glu Ile Val Gln Tyr Phe Thr Gly Glu
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35 40 45

Glu Asp Ala Asp Thr Gly Lys Thr Phe Ser Cys Val Asp Leu Phe Phe
50 55 60

Val Thr Gln Asp Gly Ser Ser Phe Lys Thr Lys Tyr Lys Phe Arg Pro
65 70 75 80

Tyr Leu Tyr Ala Ala Thr Lys Asp Asn Met Glu Leu Glu Val Glu Ala
85 90 95

Tyr Leu Arg Arg Arg Tyr Glu Arg Gln Val Ala Asp Ile Gln Ile Val
100 105 110

His Lys Glu Asp Leu Tyr Leu Lys Asn His Leu Ser Gly Leu Gln Lys
115 120 125

Lys Tyr Leu Lys Val Ser Phe Asp Thr Val Gln Gln Leu Val Glu Val
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Pro Tyr His Val Arg Phe Ala Ile Asp Asn Asp Val Arg Ser Gly Gln
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Trp Tyr Asn Val Ser Ile Ser Ser Thr Asp Val Ile Leu Glu Lys Arg
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Thr Asp Leu Leu Gln Arg Ala Glu Val Arg Val Cys Ala Phe Asp Ile
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Glu Thr Val Lys Leu Pro Leu Lys Phe Pro Asp Ala Glu Tyr Asp Gln
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Gly Ile Tyr Val Thr Tyr Asn Gly Asp Phe Phe Asp Trp Pro Phe Ile
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His Leu Asp Cys Phe Ser Trp Val Lys Arg Asp Ser Tyr Leu Pro Gln
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Gly Ser Gln Gly Leu Lys Ala Val Thr Lys Val Lys Leu Gly Tyr Asp
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Pro Gln Thr Met Ala Ser Tyr Ser Val Ser Asp Ala Val Ala Thr Tyr
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Tyr Leu Tyr Met Thr Tyr Val His Pro Phe Val Phe Ser Leu Ala Thr
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Ile Ile Pro Met Val Pro Asp Glu Val Leu Arg Lys Gly Ser Gly Thr
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Cys Pro Asn Lys Asn Gln Ala Asp Pro Glu Lys Phe Tyr Gln Gly Lys
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Leu Leu Glu Ser Glu Thr Tyr Ile Gly Gly His Val Glu Cys Leu Gln
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Ser Gly Val Phe Arg Ser Asp Ile Pro Thr Ser Phe Lys Leu Asp Ala
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Ser Ala Tyr Gln Gln Leu Ile Asp Asn Leu Gly Arg Asp Leu Glu Tyr
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Ala Ile Thr Val Glu Gly Lys Met Arg Met Asp Ser Val Ser Asn Phe
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Asp Glu Val Lys Glu Val Ile Arg Glu Lys Leu Glu Lys Leu Arg Asp
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Asp Pro Ile Arg Glu Glu Gly Pro Leu Ile Tyr His Leu Asp Val Ala
580 585 590

Ala Met Tyr Pro Asn Ile Ile Leu Thr Asn Arg Leu Gln Pro Pro Ser
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Ile Val Thr Asp Glu Val Cys Thr Ala Cys Asp Phe Asn Gly Pro Glu

610 615 620

Lys Thr Cys Leu Arg Lys Leu Glu Trp Val Trp Arg Gly Val Thr Phe
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Lys Gly Asn Lys Ser Glu Tyr Tyr His Leu Lys Lys Gln Ile Glu Ser
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Glu Ser Val Asp Ala Gly Ala Asn Met Gln Ser Ser Lys Pro Phe Leu
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Asp Leu Pro Lys Val Glu Gln Gln Ser Lys Leu Lys Glu Arg Leu Lys
675 680 685

Lys Tyr Cys Gln Lys Ala Tyr Ser Arg Val Leu Asp Lys Pro Ile Thr
690 695 700

Glu Val Arg Glu Ala Gly Ile Cys Met Arg Glu Asn Pro Phe Tyr Val
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Asp Thr Val Arg Ser Phe Arg Asp Arg Arg Tyr Glu Tyr Lys Thr Leu
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Asn Lys Val Trp Lys Gly Lys Leu Ser Glu Ala Lys Ala Ser Gly Asn
740 745 750

Leu Ile Lys Ile Gln Glu Ala His Asp Met Val Val Val Tyr Asp Ser
755 760 765

Leu Gln Leu Ala His Lys Cys Ile Leu Asn Ser Phe Tyr Gly Tyr Val
770 775 780

Met Arg Lys Gly Ala Arg Trp Tyr Ser Met Glu Met Ala Gly Val Val
785 790 795 800

Thr Tyr Thr Gly Ala Lys Ile Ile Gln Asn Ala Arg Leu Leu Ile Glu
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Arg Ile Gly Lys Pro Leu Glu Leu Asp Thr Asp Gly Ile Trp Cys Ala
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Leu Pro Gly Ser Phe Pro Glu Asn Phe Thr Phe Lys Thr Ile Asp Met
835 840 845

Lys Lys Phe Thr Ile Ser Tyr Pro Cys Val Ile Leu Asn Val Asp Val
850 855 860

Ala Lys Asn Asn Ser Asn Asp Gln Tyr Gln Thr Leu Val Asp Pro Val
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Arg Lys Thr Tyr Asn Ser Arg Ser Glu Cys Ser Ile Glu Phe Glu Val
885 890 895

Asp Gly Pro Tyr Lys Ala Met Ile Ile Pro Ala Ser Lys Glu Glu Gly
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Ile Leu Ile Lys Lys Arg Tyr Ala Val Phe Asn His Asp Gly Thr Ile
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Ala Glu Leu Lys Gly Phe Glu Met Lys Arg Arg Gly Glu Leu Lys Leu
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Ile Lys Val Phe Gln Ala Glu Leu Phe Asp Lys Phe Leu His Gly Ser
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Thr Leu Glu Glu Cys Tyr Ser Ala Val Ala Ala Val Ala Asn Arg Trp
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980 985 990

Leu Asp Tyr Ile Ser Glu Ser Ser Thr Met Ser Lys Ser Leu Ala Asp
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Tyr Gly Gln Gln Lys Ser Cys Ala Val Thr Thr Ala Lys Arg Leu Ala
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Tyr Ile Val Ala Arg Glu Pro Glu Gly Thr Pro Val Ser Glu Arg Ala
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Val Pro Val Ala Ile Phe Gln Thr Asp Asp Pro Glu Lys Lys Phe Tyr
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Leu Gln Lys Trp Cys Lys Ile Ser Ser Tyr Thr Gly Ile Arg Ser Ile
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Ile Asp Trp Met Tyr Tyr Lys Gln Arg Leu His Ser Ala Ile Gln Lys
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Val Ile Thr Ile Pro Ala Ala Met Gln Lys Val Ala Asn Pro Val Leu
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Arg Gln Gly Lys Ile Val Asp Met Phe Ser Ser Ala Asn Lys Asp His
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Ser Thr Thr Gln Asp Asn Val Val Ala Asp Ile Glu Glu Phe Cys Lys
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Glu Asn Arg Pro Ser Val Lys Gly Pro Lys Pro Val Ala Arg Ser Phe
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Glu Val Asp Arg Asn His Ser Glu Gly Lys Gln Gln Glu Ser Trp Asp
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Pro Glu Phe His Asp Ile Ser Leu Gln Asn Val Asp Lys Asn Val Asp

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Tyr Gln Gly Trp Leu Glu Leu Glu Lys Arg Lys Trp Lys Met Thr Leu
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Thr Asn Lys Lys Lys Arg Arg Phe Asp Asp Leu Lys Pro Cys Asn Gln
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Ile Asp Ala His Lys Ile Asn Lys Lys Val Cys Lys Gly Arg Val Gly
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Val Gly Ser Tyr Phe Arg Arg Pro Glu Glu Ala Leu Thr Ser Ser Tyr
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Pro Arg Val Phe Tyr Ile Asn Ser Lys Ala Ser Ile Ala Gly Asn Phe
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Thr Gly Lys Cys Ile Asn Lys Ile Leu Pro His Gly Lys Pro Cys Tyr
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Val Asn Ile Gln Glu Asp Gln Phe Ile Lys Glu Ser Lys Lys Leu Ala
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Glu Leu His Arg Ile Thr Thr Thr Glu Cys Arg Tyr Leu Glu Asn Ser
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Tyr Val Leu Tyr Cys His Ala Ser Lys Leu Met Ser Val Val Val Val
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Ser Ser Leu Asn Asp Asn Gly Ser Phe Asp Glu Asn Asn Gly Cys Ala
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Gln Ala Phe Arg Val Leu Lys Gln Leu Ile Lys Arg Leu Leu His Asp
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Ala Cys Asn Ser Gly Asn Ile Tyr Ala Asp Ser Ile Leu Gln His Leu
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Ser Trp Trp Leu Arg Ser Pro Ser Ser Lys Leu His Asp Pro Ala Leu
1765 1770 1775

His Leu Met Leu His Lys Val Met Gln Lys Val Phe Ala Leu Leu Leu
1780 1785 1790

Thr Asp Leu Arg Arg Leu Gly Ala Ile Ile Ile Tyr Ala Asp Phe Ser
1795 1800 1805

Lys Val Ile Ile Asp Thr Gly Lys Phe Asp Leu Ser Ala Ala Lys Thr
1810 1815 1820

Tyr Cys Glu Ser Leu Leu Thr Val Met Gly Ser Arg Asp Ile Phe Lys
1825 1830 1835 1840

Leu Ile Leu Leu Glu Pro Val His Tyr Trp His Ser Leu Leu Phe Met
1845 1850 1855

Asp Gln His Asn Tyr Ala Gly Ile Arg Ala Thr Gly Asp Glu Ile Ser
1860 1865 1870

Gly Asn Glu Val Thr Ile Glu Pro Lys Trp Ser Val Ala Arg His Leu
1875 1880 1885

Pro Glu Tyr Ile Gln Lys Asp Phe Ile Ile Ile Val Ala Thr Phe Ile
1890 1895 1900

Phe Gly Pro Trp Lys Phe Ala Leu Glu Lys Lys Arg Gly Ser Ala Glu
1905 1910 1915 1920

Ser Leu Glu Ala Glu Met Val Glu Tyr Leu Lys Glu Gln Ile Gly Thr
1925 1930 1935

Arg Phe Ile Ser Met Ile Val Glu Lys Ile Gly Asn Ile Arg Ser His
1940 1945 1950

Ile Lys Asp Ile Asn Val Ser Asp Ala Ser Trp Ala Ser Gly Gln Ala
1955 1960 1965

Pro Lys Gly Asp Tyr Thr Phe Glu Phe Ile Gln Ile Ile Thr Ala Val
1970 1975 1980

Leu Ala Leu Asp Gln Asn Val Gln Gln Asp Val Leu Val Met Arg Lys

1985 1990 1995 2000

Ile Leu Leu Lys Tyr Ile Lys Val Lys Glu Cys Ala Ala Glu Ala Glu
2005 2010 2015

Phe Ile Asp Pro Gly Pro Ser Phe Ile Leu Pro Asn Val Ala Cys Ser
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Asn Cys Gly Ala Tyr Arg Asp Leu Asp Phe Cys Arg Asp Ser Ala Leu
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Met Gly Met Gly Pro Asp Asp Ile Ser Arg Phe His Gln Thr Leu Glu
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225 230 235 240

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Val Pro Ala Gly Lys Tyr Met Lys Ala Ala Arg Ile Met Ser Tyr Cys
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Gln Leu Glu Leu Asp Cys Leu Tyr Ser Asp Leu Val Ser His Ala Ala
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Glu Gly Glu His Ser Lys Met Ala Pro Phe Arg Ile Leu Ser Phe Asp
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Ile Glu Cys Ala Gly Arg Lys Gly His Phe Pro Glu Pro Thr His Asp
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Pro Phe Val Arg Asn Val Met Thr Leu Lys Ser Cys Ser Pro Ile Val
355 360 365

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370 375 380

Trp Arg Asp Phe Ile Arg Glu Val Asp Pro Asp Ile Ile Ile Gly Tyr
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Val Arg Val Arg Asp Thr Thr Phe Ser Ser Arg Gln Tyr Gly Met Arg
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580 585 590

Leu Glu Ala Arg Ala Gly Phe Tyr Glu Lys Pro Ile Ala Thr Leu Asp

595 600 605

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Cys Thr Leu Val Pro Pro Glu Asp Ala Arg Lys Leu Asn Leu Pro Pro
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Glu Lys Ile Tyr Phe Pro Tyr Leu Leu Ile Ser Lys Lys Arg Tyr Ala
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Val Thr Glu Cys Leu His Lys Ile Leu Val Asp Arg Asp Val Pro Gly
850 855 860

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Pro Ile Leu Lys Asn Ala Ser Arg Glu Leu Leu His Gly Ser His Thr
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Arg Ala Val Ser Ile Ser Thr Pro Ser Asn Ser Gly Ile Met Lys Phe
995 1000 1005

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Glu Gly His Ser Val Cys Cys Asn Val His Gly Phe Glu Pro Tyr Phe
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Tyr Ile Cys Cys Pro Pro Gly Met Gly Pro Asp Asp Ile Ser His Phe
115 120 125

His Gln Thr Leu Glu Gly Arg Met Arg Glu Ala Asn Arg Asn Ser Asn
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Val Gly Lys Phe Val Arg Arg Ile Glu Met Val Gln Arg Arg Ser Ile
145 150 155 160

Met Tyr Tyr Gln Gln Ser Asn Ser Gln Pro Phe Leu Lys Ile Val Val
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Ala Leu Pro Thr Met Val Ala Ser Cys Arg Gly Ile Leu Asp Arg Gly
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195 200 205

Asn Val Leu Phe Ala Leu Arg Phe Met Ile Asp Cys Asn Ile Val Gly
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Gly Asn Trp Ile Gly Ile Pro Ala Gly Lys Tyr Lys Lys Thr Ala Lys
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Gln Gly Glu Asp Gln Pro Phe Ile Arg Asn Val Met Thr Leu Lys Ser
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Cys Ser Pro Ile Val Gly Val Asp Val Met Pro Phe Glu Thr Glu Arg
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Glu Arg Ala Leu Asn Leu Lys Ile Ala Glu Phe Pro Ile Leu Gly Arg
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Tyr Ser Leu Asn Ser Val Ser Ser His Phe Leu Ser Glu Gln Lys Glu
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Asp Val His His Ser Ile Ile Ser Asp Leu Gln Asn Gly Asn Ala Glu
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Glu Gly Ala Thr Val Leu Glu Ala Arg Ala Gly Phe Tyr Glu Lys Pro
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Tyr Asn Leu Cys Tyr Cys Thr Leu Val Ile Pro Glu Asp Ala Arg Lys
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675 680 685

Gln Met Ile Glu His Thr Lys Lys Leu Val Glu Asp Lys Phe Thr Thr
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Lys Lys Arg Tyr Ala Gly Leu Phe Trp Thr Lys Pro Asp Asn Phe Asp
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Lys Met Asp Thr Lys Gly Ile Glu Thr Val Arg Arg Asp Asn Cys Leu
785 790 795 800

Leu Val Lys Asn Leu Val Asn Asp Cys Leu His Lys Ile Leu Ile Asp
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850 855 860

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Gly Asp Arg Val Pro Tyr Val Ile Ile Lys Ala Ala Lys Gly Ala Lys
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Pro Ile Asp Pro His Tyr Tyr Leu Glu Asn Gln Ile Ser Lys Pro Ile
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Leu Arg Ile Phe Glu Pro Ile Leu Lys Asn Ala Ser Lys Glu Leu Leu
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His Gly Ser His Thr Arg Ser Ile Ser Ile Ser Thr Pro Ser Asn Ser
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915 920 925

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Ala Leu Pro Tyr Lys Pro Tyr Phe Tyr Ile Ala Thr Arg Lys Gly Cys
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Glu Asp Gly Ala Val Leu Pro Gln Trp Leu Cys Ser Asn Cys Gln Ala
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Gly Gly Gln Phe Ser Thr Ala Asp Ile Asp Pro Arg Trp Arg Arg Pro
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Thr Leu Arg Ala Leu Asp Pro Ser Thr Glu Pro Leu Ile Phe Gln Gln
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Tyr Phe Tyr Thr Pro Ala Pro Pro Gly Phe Gly Ala Glu His Leu Ser
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740 745 750

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755 760 765

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915 920 925

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Ala Leu Pro Tyr Met Pro Tyr Phe Tyr Ile Ala Ala Arg Lys Gly Cys
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Ser Ile Leu Gln Gly Gly Ser Val Ile Thr Asp Glu Glu Glu Thr Ser
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Lys Lys Ile Ala Asp Gln Leu Asp Asn Ile Val Asp Met Arg Glu Tyr
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Glu Ala Leu Glu Ser Gly Val Phe Arg Ser Asp Ile Pro Cys Arg Phe
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Thr Met Arg His Ala Ile Glu Glu Glu Glu Lys Val Pro Val Glu Gln
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Ala Thr Asn Phe Gln Glu Val Cys Glu Gln Ile Lys Thr Lys Leu Thr
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Ser Leu Lys Asp Val Pro Asn Arg Ile Glu Cys Pro Leu Ile Tyr His
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Gln Pro Ser Ala Ile Val Asp Glu Ala Thr Cys Ala Ala Cys Asp Phe
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Gly Glu Phe Met Pro Ala Ser Arg Ser Glu Tyr His Arg Ile Gln His
675 680 685

Gln Leu Glu Ser Glu Lys Phe Pro Pro Leu Phe Pro Glu Gly Pro Ala
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Arg Arg Leu Ala Asp Tyr Cys Arg Lys Ala Tyr Lys Lys Ile His Val

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Thr Lys Val Glu Glu Arg Leu Thr Thr Ile Cys Gln Arg Glu Asn Ser
740 745 750

Phe Tyr Val Asp Thr Val Arg Ala Phe Arg Asp Arg Arg Tyr Glu Phe
755 760 765

Lys Gly Leu His Lys Val Trp Lys Lys Lys Leu Ser Ala Ala Val Glu
770 775 780

Val Gly Asp Ala Ser Glu Val Lys Arg Cys Lys Asn Met Glu Ile Leu
785 790 795 800

Tyr Asp Ser Leu Gln Leu Ala His Lys Cys Ile Leu Asn Ser Phe Tyr
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Gly Tyr Val Met Arg Lys Gly Ala Arg Trp Tyr Ser Met Glu Met Ala
820 825 830

Gly Ile Val Cys Phe Thr Gly Ala Asn Ile Ile Thr Gln Ala Arg Glu
835 840 845

Leu Ile Glu Gln Ile Gly Arg Pro Leu Glu Leu Asp Thr Asp Gly Ile
850 855 860

Trp Cys Val Leu Pro Asn Ser Phe Pro Glu Asn Phe Val Ile Lys Thr
865 870 875 880

Thr Asn Ala Lys Lys Pro Lys Leu Thr Ile Ser Tyr Pro Gly Ala Met
885 890 895

Leu Asn Ile Met Val Lys Glu Gly Phe Thr Asn His Gln Tyr Gln Glu
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Leu Thr Glu Pro Ser Ser Leu Thr Tyr Val Thr His Ser Glu Asn Ser

915 920 925

Ile Phe Phe Glu Val Asp Gly Pro Tyr Leu Ala Met Ile Leu Pro Ala
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Ser Lys Glu Glu Gly Lys Lys Leu Lys Lys Arg Tyr Ala Val Phe Asn
945 950 955 960

Glu Asp Gly Ser Leu Ala Glu Leu Lys Gly Phe Glu Val Lys Arg Arg
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Gly Glu Leu Gln Leu Ile Lys Ile Phe Gln Ser Ser Val Phe Glu Ala
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Phe Leu Lys Gly Ser Thr Leu Glu Glu Val Tyr Gly Ser Val Ala Lys
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Val Ala Asp Tyr Trp Leu Asp Val Leu Tyr Ser Lys Ala Ala Asn Met
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Pro Asp Ser Glu Leu Phe Glu Leu Ile Ser Glu Asn Arg Ser Met Ser
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Arg Lys Leu Glu Asp Tyr Gly Glu Gln Lys Ser Thr Ser Ile Ser Thr
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Val Thr Glu Arg Ala Ile Pro Leu Ala Ile Phe Gln Ala Glu Pro Thr
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Gln Val Lys Asn Pro Val Pro Arg Val Lys His Pro Asp Trp Leu His
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Lys Lys Leu Leu Glu Lys Asn Asp Ile Tyr Lys Gln Lys Lys Ile Ser
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Glu Leu Phe Val Leu Glu Gly Lys Arg Gln Ile Val Met Ala Gln Ala
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Ser Glu Asn Ser Leu Ser Leu Cys Thr Pro Asp Met Glu Asp Ile Gly
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Leu Thr Lys Pro His His Ser Thr Val Pro Val Ala Thr Lys Arg Lys
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Arg Val Trp Glu Thr Gln Lys Glu Ser Gln Asp Ile Ala Leu Thr Val
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Pro Trp Gln Glu Val Leu Gly Gln Pro Pro Ser Leu Gly Thr Thr Gln
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Pro Trp Gln Ile Ile Gln Ile Ser Glu Thr Arg Gln Ala Gly Leu Phe
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Arg Leu Trp Ala Ile Ile Gly Asn Asp Leu His Cys Ile Lys Leu Ser
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Glu His Ile Asn Glu Ile Asn Thr Glu Leu Ser Val Pro Asp Ile Glu
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Leu Tyr His His Thr Gln Gly His Lys Ala Leu Phe Gly Val Phe Ile
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Asn Gln Met Pro Gly Leu Ser Ala Leu Tyr Ser Ser Glu His Ser Leu
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Gln Arg Phe Leu Leu Ala Tyr Lys Glu Glu Arg Arg Gly Pro Thr Leu
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Ile Ala Val Gln Ser Ser Trp Glu Leu Cys Arg Leu Thr Ser Glu Ile
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Pro Val Leu Glu Glu Phe Pro Leu Val Pro Ile Arg Val Ala Asp Lys
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Ile Ser Tyr Ala Val Leu Asp Trp Gln Arg His Gly Ala Arg Arg Met
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Ile Arg His Tyr Leu Asn Leu Asp Leu Cys Leu Ser Gln Ala Phe Glu
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Met Ser Arg Tyr Phe His Ile Pro Val Gly Asn Leu Pro Glu Asp Ile
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Ser Ile Phe Gly Ser Asp Leu Phe Phe Ala Arg His Leu Gln His His
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Asn His Leu Leu Trp Leu Ser Pro Thr Ser Arg Pro Asp Leu Gly Gly
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Lys Glu Ala Asp Asp Asn Arg Leu Val Met Glu Phe Asp Asp Arg Ala

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Thr Val Glu Ile Asn Ser Ser Gly Cys Tyr Ser Thr Val Cys Val Glu
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Leu Asp Ile Gln Asn Leu Ala Val Asn Thr Ile Leu Gln Ser His His
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Val Asn Asp Met Glu Gly Ala Gly Ser Met Gly Ile Ser Phe Asp Val
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Ile Gln Gln Ala Ser Leu Glu Asp Met Val Thr Gly Asn Gln Ala Ala
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Ser Ala Leu Ala Asn Tyr Asp Glu Thr Ala Leu Cys Ser Ser Thr Phe
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Arg Ile Leu Lys Ser Met Val Val Gly Trp Val Lys Glu Ile Thr Gln
1795 1800 1805

Tyr His Asn Ile Tyr Ala Asp Asn Gln Val Met His Phe Tyr Arg Trp
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Leu Gln Ser Pro Cys Ser Leu Leu His Asp Pro Ala Leu His Arg Thr
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Leu His Asn Met Met Lys Lys Leu Phe Leu Gln Leu Ile Ala Glu Phe
1845 1850 1855

Lys Arg Leu Gly Ser Ser Val Val Tyr Ala Asn Phe Asn Arg Ile Ile
1860 1865 1870

Leu Cys Thr Lys Lys Arg Arg Ile Glu Asp Ala Leu Ala Tyr Val Glu
1875 1880 1885

Tyr Ile Thr Asn Ser Ile His Ser Lys Glu Ile Phe His Ser Leu Thr
1890 1895 1900

Ile Ser Phe Ser Arg Cys Trp Glu Phe Leu Leu Trp Met Asp Pro Ser
1905 1910 1915 1920

Asn Tyr Gly Gly Ile Lys Gly Lys Val Pro Ser Ser Ile His Cys Gly
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Gln Val Lys Glu Gln Asp Ser Gln Ala Arg Glu Glu Thr Asp Glu Glu
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Glu Val Glu Asp Leu Leu Glu Asn Asn Trp Asn Ile Leu Gln Phe Leu
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Pro Gln Ala Ala Ser Cys Gln Ser Tyr Phe Leu Met Ile Val Ser Ala
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Tyr Ile Val Ala Val Tyr Gln Ser Met Lys Glu Glu Leu Arg His Ser
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Ala Pro Gly Ser Thr Pro Val Lys Arg Lys Gly Ala Ser Gln Phe Ser
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Gln Phe Ser Thr Ala Asp Ile Asp Pro Arg Trp Leu Arg Pro Thr Pro
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Leu Ala Leu Asp Pro Ser Thr Glu Pro Leu Ile Phe Gln Gln Leu Glu
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Ile Asp His Tyr Val Gly Thr Ser Pro Pro Leu Pro Glu Gly Pro Pro
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Ala Ser Arg Asn Ser Val Pro Ile Leu Arg Ala Phe Gly Val Thr Asp
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Glu Gly Phe Ser Val Cys Cys His Ile His Gly Phe Ala Pro Tyr Phe
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Tyr Thr Pro Ala Pro Pro Gly Phe Gly Ala Glu His Leu Ser Glu Leu
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Glu Leu Ser Gly Pro Ala Val Leu Ala Ile Glu Leu Cys Ser Arg Glu
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Ser Met Phe Gly Tyr His Gly His Gly Pro Ser Pro Phe Leu Arg Ile
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Glu Ala Asn Val Asp Phe Glu Ile Arg Phe Met Val Asp Ala Asp Ile
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Val Glu Met Ala Arg Val Thr Gly Val Pro Leu Gly Tyr Leu Leu Ser
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Arg Glu Gly Leu Leu Met Pro Val Val Lys Thr Glu Gly Gly Glu Asp
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Tyr Thr Gly Ala Thr Val Ile Glu Pro Leu Lys Gly Tyr Tyr Asp Val
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Pro Ile Ala Thr Leu Asp Phe Ser Ser Leu Tyr Pro Ser Ile Met Met
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Ala His Asn Leu Cys Tyr Thr Thr Leu Leu Arg Pro Gly Ala Ala Gln

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Lys Leu Gly Leu Lys Pro Asp Glu Phe Ile Lys Thr Pro Thr Gly Asp
625 630 635 640

Glu Phe Val Lys Ala Ser Val Arg Lys Gly Leu Leu Pro Gln Ile Leu
645 650 655

Glu Asn Leu Leu Ser Ala Arg Lys Arg Ala Lys Ala Glu Leu Ala Gln
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Glu Thr Asp Pro Leu Arg Arg Gln Val Leu Asp Gly Arg Gln Leu Ala
675 680 685

Leu Lys Val Ser Pro Asn Ser Val Tyr Gly Phe Thr Gly Ala Gln Val
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Gly Lys Leu Pro Cys Leu Glu Ile Ser Gln Ser Val Thr Gly Phe Gly
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Asp Ser Val Met Cys Arg Phe Gly Val Ser Ser Val Ala Glu Ala Met
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Ser Leu Gly Arg Glu Ala Ala Asn Trp Val Ser Ser His Phe Pro Ser
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Pro Ile Arg Leu Glu Phe Glu Lys Val Tyr Phe Pro Tyr Leu Leu Ile
785 790 795 800

Ser Lys Lys Arg Tyr Ala Gly Leu Leu Phe Ser Ser Arg Ser Asp Ala
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His Asp Arg Met Asp Cys Lys Gly Leu Glu Ala Val Arg Arg Asp Asn
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Cys Pro Leu Val Ala Asn Leu Val Thr Ser Ser Leu Arg Arg Ile Leu
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Val Asp Arg Asp Pro Asp Gly Ala Val Ala His Ala Lys Asp Val Ile
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Ser Asp Leu Leu Cys Asn Arg Ile Asp Ile Ser Gln Leu Val Ile Thr
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Lys Glu Leu Thr Arg Ala Ala Ala Asp Tyr Ala Gly Lys Gln Ala His
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Val Glu Leu Ala Glu Arg Met Arg Lys Arg Asp Pro Gly Ser Ala Pro
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Asn Leu Gly Asp Arg Val Pro Tyr Val Ile Ile Gly Ala Ala Lys Gly
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Ser Lys Val Gly Gly Leu Leu Ala Phe Thr Lys Arg Arg Asn Ser Cys
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Arg Leu Gln Glu Gln Glu Glu Glu Glu Leu Gln Ser Ala Leu Glu Ala
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Ala Asp Gly Gln Phe Ser Pro Thr Ala Ile Asp Ala Arg Trp Leu Arg
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Pro Ala Pro Pro Ala Leu Asp Pro Gln Met Glu Pro Leu Ile Phe Gln
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Gln Leu Glu Ile Asp His Tyr Val Ala Pro Ala Arg Pro Leu Pro Gly

100 105 110

Ala Pro Pro Pro Ser Gln Asp Ser Val Pro Ile Leu Arg Ala Phe Gly
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Val Thr Asn Glu Gly Val Ser Val Cys Cys His Ile His Gly Phe Ala
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Pro Tyr Phe Tyr Thr Pro Ala Pro Pro Gly Phe Gly Pro Glu His Leu
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Gly Gly Lys Glu Leu Thr Gly Pro Ala Val Leu Ala Val Glu Leu Cys
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Ser Arg Glu Ser Met Phe Gly Tyr His Gly His Gly Pro Ser Pro Phe
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Ala Pro Tyr Glu Ala Asn Val Asp Phe Glu Ile Arg Phe Met Val Asp
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Thr Asp Ile Val Gly Cys Asn Trp Leu Glu Leu Pro Ala Gly Lys Tyr
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Ser Tyr Glu Arg Glu Glu Asp Leu Leu Gln Ala Trp Ser Thr Phe Ile
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Arg Ile Met Asp Pro Asp Val Ile Thr Gly Tyr Asn Ile Gln Asn Phe
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Asp Leu Pro Tyr Leu Ile Ser Arg Ala Gln Thr Leu Lys Val Pro Gly
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Phe Pro Leu Leu Gly Arg Val Ile Gly Leu Arg Ser Asn Ile Arg Glu
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Tyr Asp Val Pro Ile Ala Thr Leu Asp Phe Ser Ser Leu Tyr Pro Ser
595 600 605

Ile Met Met Ala His Asn Leu Cys Tyr Thr Thr Leu Leu Arg Pro Gly
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Ala Ala Gln Lys Leu Gly Leu Thr Glu Asp Gln Phe Ile Lys Thr Pro
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Thr Gly Asp Glu Phe Val Lys Ala Ser Val Arg Lys Gly Leu Leu Pro
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Gln Ile Leu Glu Asn Leu Leu Ser Ala Arg Lys Arg Ala Lys Ala Glu
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Leu Ala Lys Glu Thr Asp Pro Leu Arg Arg Gln Val Leu Asp Gly Arg
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Gln Leu Ala Leu Lys Val Ser Ala Asn Ser Val Tyr Gly Phe Thr Gly

690 695 700

Ala Gln Val Gly Arg Leu Pro Cys Leu Glu Ile Ser Gln Ser Val Thr
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Gly Phe Gly Arg Gln Met Ile Glu Lys Thr Lys Gln Leu Val Glu Thr
725 730 735

Lys Tyr Thr Val Glu Asn Gly Tyr Ser Thr Ser Ala Lys Val Val Tyr
740 745 750

Gly Asp Thr Asp Ser Val Met Cys Arg Phe Gly Val Ser Ser Val Ala
755 760 765

Glu Ala Met Ala Leu Gly Arg Glu Ala Ala Asp Trp Val Ser Gly His
770 775 780

Phe Pro Ser Pro Ile Arg Leu Glu Phe Glu Lys Val Tyr Phe Pro Tyr
785 790 795 800

Leu Leu Ile Ser Lys Lys Arg Tyr Ala Gly Leu Leu Phe Ser Ser Arg
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Pro Asp Ala His Asp Arg Met Asp Cys Lys Gly Leu Glu Ala Val Arg
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850 855 860

Asp Val Ile Ser Asp Leu Leu Cys Asn Arg Ile Asp Ile Ser Gln Leu
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Val Ile Thr Lys Glu Leu Thr Arg Ala Ala Ala Asp Tyr Ala Gly Lys
885 890 895

Gln Ala His Val Glu Leu Ala Glu Arg Met Arg Lys Arg Asp Pro Gly
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Ser Ala Pro Ser Leu Gly Asp Arg Val Pro Tyr Val Ile Ile Ser Ala
915 920 925

Ala Lys Gly Val Ala Ala Tyr Met Lys Ser Glu Asp Pro Leu Phe Val
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Arg Ala Glu Ala Val Leu Leu Arg Gly Asp His Thr Arg Cys Lys Thr
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Val Leu Thr Gly Lys Val Gly Gly Leu Leu Ala Phe Ala Lys Arg Arg
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Cys Lys Phe Cys Gln Pro Arg Glu Ser Glu Leu Tyr Gln Lys Glu Val
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Ser His Leu Ser Ala Leu Glu Glu Arg Phe Ser Arg Leu Trp Thr Gln
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Cys Gln Arg Cys Gln Gly Ser Leu His Glu Asp Val Ile Cys Thr Ser
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<213> Drosophila melanogaster

<400> 64

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Gly Asp Gly Pro Glu Asn Gln Thr Thr Ser Glu Arg Trp Ser Arg Pro
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Pro Pro Pro Glu Leu Asp Pro Ser Lys His Asn Leu Glu Phe Gln Gln
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Leu Asp Val Glu Asn Tyr Leu Gly Gln Pro Leu Pro Gly Met Pro Gly
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Tyr Ile Glu Ala Pro Ser Gln Phe Glu Glu His His Cys Glu Lys Leu
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Gln Lys Ala Leu Asp Gln Lys Val Ile Ala Asp Ile Arg Asn Asn Lys
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Asp Asn Val Gln Glu Ala Val Leu Met Val Glu Leu Val Glu Lys Leu
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Leu Cys His Asp Lys Glu Thr Gln Met Leu Asp Lys Trp Ser Ala Phe
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Val Arg Glu Val Asp Pro Asp Ile Leu Thr Gly Tyr Asn Ile Asn Asn
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Phe Asp Phe Pro Tyr Leu Leu Asn Arg Ala Ala His Leu Lys Val Arg
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Glu Gln Met Leu Gln Ser Lys Gln Met Gly Arg Arg Glu Asn Gln Tyr
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Val Asn Phe Glu Gly Arg Val Pro Phe Asp Leu Leu Phe Val Leu Leu
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Leu Lys Asp Ala Tyr Leu Pro Leu Arg Leu Leu Glu Lys Leu Met Ala
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Ile Val Asn Tyr Met Glu Met Ala Arg Val Thr Gly Val Pro Leu Glu
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Arg Lys Ala Lys Thr Lys Gly Phe Ile Met Pro Ser Tyr Thr Ser Gln
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565 570 575

Gly Tyr Tyr Ala Asp Pro Ile Ser Thr Leu Asp Phe Ala Ser Leu Tyr
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Pro Ser Ile Met Met Ala His Asn Leu Cys Tyr Thr Thr Leu Val Leu
595 600 605

Gly Gly Thr Arg Glu Lys Leu Arg Gln Gln Glu Asn Leu Gln Asp Asp
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Leu Pro Asp Ser Glu Leu Phe Glu Leu Ile Ser Glu Asn Lys Ser Met
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Ser Lys Lys Leu Glu Glu Tyr Gly Ala Gln Lys Ser Thr Ser Ile Ser
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Thr Ala Lys Arg Leu Ala Glu Phe Leu Gly Glu Gln Met Val Lys Asp
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Ala Gly Leu Ala Cys Lys Tyr Ile Ile Ser Lys Lys Pro Glu Gly Ala
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Pro Val Thr Glu Arg Ala Ile Pro Leu Ala Ile Phe Gln Ser Glu Pro
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Ser Val Arg Arg His His Leu Arg Arg Trp Leu Lys Asp Asn Thr Met
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Gly Asp Ala Asp Ile Arg Asp Val Leu Asp Trp Asn Tyr Tyr Ile Glu
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Arg Leu Gly Gly Thr Ile Gln Lys Ile Ile Thr Ile Pro Ala Ala Leu
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Gln Gly Leu Ala Asn Pro Val Pro Arg Val Gln His Pro Asp Trp Leu
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His Lys Lys Met Leu Glu Lys Asn Asp Val Leu Lys Gln Arg Arg Ile
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Asn Glu Met Phe Thr Ser Arg Pro Lys Pro Lys Pro Leu Ala Thr Glu
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Glu Asp Lys Leu Ala Asp Met Glu Asp Leu Ala Gly Lys Asp Gly Gly
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Glu Gly Ala Ala Gly Cys Pro Ile Val Thr Lys Arg Lys Arg Ile Gln
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Asp Gln Arg Gln Arg Asn Arg Gln Ala Ser Lys Arg Thr Arg Gly Glu
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Asp Pro Arg Tyr Thr Gly Arg Phe Leu Arg Arg Ala Gln Arg Thr Leu
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Gly His Phe Thr Val Trp Ala Leu Ile Gly Glu Glu Leu His Lys Ile
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Lys Leu Thr Val Pro Arg Ile Phe Tyr Val Asn Gln Arg Ser Ala Ala
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Pro Pro Glu Glu Gly Gln Leu Trp Arg Lys Val Asn Arg Val Leu Pro
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Arg Ser Arg Pro Val Phe Asn Leu Tyr Arg Tyr Ser Val Pro Glu Gln
1380 1385 1390

Leu Phe Arg Asp Asn Ser Leu Gly Met Leu Ala Asp Leu Ala Thr Pro
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Gln Leu Glu Gln Gly Pro Arg Leu Arg Ser Asn Ile Trp Leu Ala Pro
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Thr Ile Asp Cys Ala Lys Ser Thr Cys Ile Ser Ile Thr His Arg Arg
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Pro Arg Arg Arg Ser Val Ser Leu Ile Pro Met Pro Ser Lys Lys Ala
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Leu Gln Thr Ala Leu Ser Ala Arg Lys Leu Ser Leu Ala Met Pro Ile
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Leu Leu Ser Gly Leu Asp Trp Gln Arg Gln Gly Ser Arg Ala Val Ile
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Arg His Phe Leu Asn Leu Asn Asn Val Leu Asp Leu Met Leu Asp Gln
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Cys Arg Tyr Phe His Val Pro Ile Gly Asn Met Pro Pro Asp Thr Val
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Leu Phe Gly Ala Asp Leu Phe Phe Ala Arg Leu Leu Gln Arg His Asn
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Phe Val Leu Trp Trp Ser Ala Ser Thr Arg Pro Asp Leu Gly Gly Arg
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Gln Glu Met Glu Gly Ala Ser Ser Ala Ile Thr Phe Asp Val Met Pro
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Pro Ser Tyr Asp Glu Thr Ala Leu Cys Ser Ala Ala Phe Arg Val Met
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Arg Ser Met Val Asn Gly Trp Leu Arg Glu Val Ser Ile Asn Arg Asn
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Ile Phe Ser Asp Phe Gln Ile Val His Phe Tyr Arg Trp Val Arg Ser
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Ser Asn Ala Leu Leu Tyr Asp Pro Ala Leu Arg Arg Ser Leu Asn Asn
1825 1830 1835 1840

Leu Met Arg Lys Met Phe Leu Arg Ile Ile Ala Glu Phe Lys Arg Leu
1845 1850 1855

Gly Ala Thr Ile Ile Tyr Ala Asp Phe Asn Arg Ile Ile Leu Ser Ser
1860 1865 1870

Gly Lys Lys Thr Val Ser Asp Ala Leu Gly Tyr Val Asp Tyr Ile Val
1875 1880 1885

Gln Ser Leu Arg Asn Lys Glu Met Phe His Ser Ile Gln Leu Ser Phe
1890 1895 1900

Glu Gln Cys Trp Asn Phe Met Leu Trp Met Asp Gln Ala Asn Phe Ser
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Gly Ile Arg Gly Lys Leu Pro Lys Gly Ile Asp Glu Thr Val Ser Ser
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Ile Val Ser Thr Thr Met Ile Arg Asp Ser Glu Arg Asn Gln Asp Asp
1940 1945 1950

Asp Glu Asp Glu Glu Glu Asp Ser Glu Asn Arg Asp Pro Val Glu Ser
1955 1960 1965

Asn Glu Ala Glu Gln Asp Gln Glu Asp Glu Leu Ser Leu Glu Leu Asn
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Trp Thr Ile Gly Glu His Leu Pro Asp Glu Asn Glu Cys Arg Glu Lys
1985 1990 1995 2000

Phe Glu Ser Leu Leu Thr Leu Phe Met Gln Ser Leu Ala Glu Lys Lys
2005 2010 2015

Thr Thr Glu Gln Ala Ile Lys Asp Ile Ser His Cys Ala Phe Asp Phe
2020 2025 2030

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Pro Gly Val Pro Pro Lys Arg Ala Arg Gly His Leu Trp Asp Glu Asp
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gag cct tcg ccg tcg cag ttt gag gcg aac ctg gca ctg ctg gag gaa      149
Glu Pro Ser Pro Ser Gln Phe Glu Ala Asn Leu Ala Leu Leu Glu Glu
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ata gag gct gag aac cgg ctg cag gag gca gag gag gag ctg cag ctg      197
Ile Glu Ala Glu Asn Arg Leu Gln Glu Ala Glu Glu Glu Leu Gln Leu
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Pro Pro Glu Gly Thr Val Gly Gly Gln Phe Ser Thr Ala Asp Ile Asp
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Pro Arg Trp Arg Arg Pro Thr Leu Arg Ala Leu Asp Pro Ser Thr Glu
75                  80                  85                  90

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Pro Leu Ile Phe Gln Gln Leu Glu Ile Asp His Tyr Val Gly Ser Ala
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Pro Pro Leu Pro Glu Gly Pro Leu Pro Ser Arg Asn Ser Val Pro Ile
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Ser Arg Asp Gln Arg Gly Gly Lys Glu Leu Ser Gly Pro Ala Val Leu
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Gly Pro Ser Pro Phe Leu Arg Ile Thr Leu Ala Leu Pro Arg Leu Met
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Gly Thr Pro Ser Phe Ala Pro Tyr Glu Ala Asn Val Asp Phe Glu Ile
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Arg Phe Met Val Asp Ala Asp Ile Val Gly Cys Asn Trp Leu Glu Leu
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270 275 280

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Gln Leu Glu Val Asp Val Leu Trp Ser Asp Val Ile Ser His Pro Pro
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Gly Ala Lys Val Gln Ser Tyr Glu Arg Glu Glu Asp Leu Leu Gln Ala
365 370 375

tgg gcc gac ttc atc ctt gcc atg gac cct gac gtg atc acc ggc tac 1205
Trp Ala Asp Phe Ile Leu Ala Met Asp Pro Asp Val Ile Thr Gly Tyr
380 385 390

aac att cag aac ttt gac ctc cca tac ctc atc tct cgg gca cag gcc 1253
Asn Ile Gln Asn Phe Asp Leu Pro Tyr Leu Ile Ser Arg Ala Gln Ala
395 400 405 410

cta aag gtg gac cgc ttc cct ttc ctg ggc cgc gtg act ggt ctc cgc 1301

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tcc aac atc cgt gac tcc tcc ttc caa tca agg cag gtc ggc cgg cgg    1349
Ser Asn Ile Arg Asp Ser Ser Phe Gln Ser Arg Gln Val Gly Arg Arg
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gac agt aag gtg atc agc atg gtg ggt cgc gtt cag atg gat atg ctg    1397
Asp Ser Lys Val Ile Ser Met Val Gly Arg Val Gln Met Asp Met Leu
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cag gtg ctg ctt cgg gaa cac aag ctc cgc tcc tac acg ctc aac gct    1445
Gln Val Leu Leu Arg Glu His Lys Leu Arg Ser Tyr Thr Leu Asn Ala
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gtg agt ttc cac ttc ctg ggc gag cag aag gag gac gtt cag cac agc    1493
Val Ser Phe His Phe Leu Gly Glu Gln Lys Glu Asp Val Gln His Ser
475                 480                 485                 490

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Ile Ile Thr Asp Leu Gln Asn Gly Asn Glu Gln Thr Arg Arg Arg Leu
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gcc gtg tac tgc ctg aag gac gcc ttt ctg cca ctc cga cta cta gag    1589
Ala Val Tyr Cys Leu Lys Asp Ala Phe Leu Pro Leu Arg Leu Leu Glu
            510                 515                 520

cgc ctt atg gtg ctg gtg aat aat gtg gag atg gcg cgt gtc acg ggt    1637
Arg Leu Met Val Leu Val Asn Asn Val Glu Met Ala Arg Val Thr Gly
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gta ccc ctt ggg tac ctg ctc acc cgg ggc cag cag gtc aag gtc gtg    1685
Val Pro Leu Gly Tyr Leu Leu Thr Arg Gly Gln Gln Val Lys Val Val
    540                 545                 550

tct cag ctg ctg cgc cag gcc atg cgc cag ggg ctg ctg atg cct gtg    1733
Ser Gln Leu Leu Arg Gln Ala Met Arg Gln Gly Leu Leu Met Pro Val
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575 580 585

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Pro Leu Lys Gly Tyr Tyr Asp Val Pro Ile Ala Thr Leu Asp Phe Ser
590 595 600

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Ser Leu Tyr Pro Ser Ile Met Met Ala His Asn Leu Cys Tyr Thr Thr
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Phe Ile Lys Thr Pro Thr Gly Asp Glu Phe Val Lys Ser Ser Val Arg
635 640 645 650

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655 660 665

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670 675 680

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685 690 695

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Tyr Gly Phe Thr Gly Ala Gln Val Gly Lys Leu Pro Cys Leu Glu Ile
700 705 710

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Ser Gln Ser Val Thr Gly Phe Gly Arg Gln Met Ile Glu Lys Thr Lys
715 720 725 730

cag ctt gtg gag tcc aag tac acc gtg gaa aat ggc tac gat gcc aac 2261
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735 740 745

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750 755 760

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Val Ser Ser Val Ala Glu Ala Met Ser Leu Gly Arg Glu Ala Ala Asn
765 770 775

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Trp Val Ser Ser His Phe Pro Ser Pro Ile Arg Leu Glu Phe Glu Lys
780 785 790

gtt tac ttc cca tac ctg ctc atc agc aag aag cgc tat gct ggc ctg 2453
Val Tyr Phe Pro Tyr Leu Leu Ile Ser Lys Lys Arg Tyr Ala Gly Leu
795 800 805 810

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815 820 825

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Leu Glu Ala Val Arg Arg Asp Asn Cys Pro Leu Val Ala Asn Leu Val
830 835 840

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Thr Ser Ser Leu Arg Arg Ile Leu Val Asp Arg Asp Pro Asp Gly Ala
845 850 855

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Asp Ile Ser Gln Leu Val Ile Thr Lys Glu Leu Thr Arg Ala Ala Ala
875 880 885 890

gac tat gct ggc aag cag gct cac gtg gag ctg gct gag agg atg agg 2741
Asp Tyr Ala Gly Lys Gln Ala His Val Glu Leu Ala Glu Arg Met Arg
895 900 905

aag cgc gac ccc ggc agt gcg ccc agc ctg ggt gac cga gtc ccc tat 2789
Lys Arg Asp Pro Gly Ser Ala Pro Ser Leu Gly Asp Arg Val Pro Tyr
910 915 920

gtg atc att ggt gct gct aag ggt gtg gcc gcc tac atg aag tcg gag 2837
Val Ile Ile Gly Ala Ala Lys Gly Val Ala Ala Tyr Met Lys Ser Glu
925 930 935

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Asp Pro Leu Phe Val Leu Glu His Ser Leu Pro Ile Asp Thr Gln Tyr
940 945 950

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Tyr Leu Glu Gln Gln Leu Ala Lys Pro Leu Leu Arg Ile Phe Glu Pro
955 960 965 970

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Tyr Met Arg Lys Lys Val Arg Lys Asp Leu Glu Asp Gln Glu Arg
1080 1085 1090

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Gly Gly Gln Phe Ser Thr Ala Asp Ile Asp Pro Arg Trp Arg Arg Pro
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Leu Glu Ile Asp His Tyr Val Gly Ser Ala Pro Pro Leu Pro Glu Gly
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Pro Leu Pro Ser Arg Asn Ser Val Pro Ile Leu Arg Ala Phe Gly Val
115 120 125

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Tyr Phe Tyr Thr Pro Ala Pro Pro Gly Phe Gly Ala Glu His Leu Ser

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Glu Leu Gln Gln Glu Leu Asn Ala Ala Ile Ser Arg Asp Gln Arg Gly
165 170 175

Gly Lys Glu Leu Ser Gly Pro Ala Val Leu Ala Ile Glu Leu Cys Ser
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Pro Tyr Glu Ala Asn Val Asp Phe Glu Ile Arg Phe Met Val Asp Ala
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Arg Arg Ala Glu Lys Lys Ala Thr Leu Cys Gln Leu Glu Val Asp Val
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Leu Thr Leu Arg Pro Cys Ala Pro Ile Leu Gly Ala Lys Val Gln Ser
355 360 365

Tyr Glu Arg Glu Glu Asp Leu Leu Gln Ala Trp Ala Asp Phe Ile Leu
370 375 380

Ala Met Asp Pro Asp Val Ile Thr Gly Tyr Asn Ile Gln Asn Phe Asp
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Leu Pro Tyr Leu Ile Ser Arg Ala Gln Ala Leu Lys Val Asp Arg Phe
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Ser Phe Gln Ser Arg Gln Val Gly Arg Arg Asp Ser Lys Val Ile Ser
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Met Val Gly Arg Val Gln Met Asp Met Leu Gln Val Leu Leu Arg Glu
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His Lys Leu Arg Ser Tyr Thr Leu Asn Ala Val Ser Phe His Phe Leu
465 470 475 480

Gly Glu Gln Lys Glu Asp Val Gln His Ser Ile Ile Thr Asp Leu Gln
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Asn Gly Asn Glu Gln Thr Arg Arg Arg Leu Ala Val Tyr Cys Leu Lys
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Asn Asn Val Glu Met Ala Arg Val Thr Gly Val Pro Leu Gly Tyr Leu
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Ala Met Arg Gln Gly Leu Leu Met Pro Val Val Lys Thr Glu Gly Ser
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580 585 590

Asp Val Pro Ile Ala Thr Leu Asp Phe Ser Ser Leu Tyr Pro Ser Ile
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Met Met Ala His Asn Leu Cys Tyr Thr Thr Leu Leu Arg Pro Gly Ala
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Gly Asp Glu Phe Val Lys Ser Ser Val Arg Lys Gly Leu Leu Pro Gln
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Tyr Thr Val Glu Asn Gly Tyr Asp Ala Asn Ala Lys Val Val Tyr Gly
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Ile Thr Lys Glu Leu Thr Arg Ala Ala Ala Asp Tyr Ala Gly Lys Gln

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Lys Gly Val Ala Ala Tyr Met Lys Ser Glu Asp Pro Leu Phe Val Leu
930 935 940

Glu His Ser Leu Pro Ile Asp Thr Gln Tyr Tyr Leu Glu Gln Gln Leu
945 950 955 960

Ala Lys Pro Leu Leu Arg Ile Phe Glu Pro Ile Leu Gly Glu Gly Arg
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980 985 990

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995 1000 1005

Cys Cys Ile Gly Cys Arg Ser Val Ile Asp His Gln Gly Ala Val
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Phe Glu Ala Asn Leu Ala Leu Leu Glu Glu Ile Glu Ala Glu Asn Arg
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115 120 125

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130 135 140

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Tyr Phe Tyr Thr Pro Ala Pro Pro Gly Phe Gly Ala Glu His Leu Ser
145 150 155 160

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Glu Leu Gln Gln Glu Leu Asn Ala Ala Ile Ser Arg Asp Gln Arg Gly
165 170 175

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Gly Lys Glu Leu Ser Gly Pro Ala Val Leu Ala Ile Glu Leu Cys Ser
180 185 190

cgt gag agc atg ttt ggg tac cac ggt cat ggc cct tct cca ttt ctc 624
Arg Glu Ser Met Phe Gly Tyr His Gly His Gly Pro Ser Pro Phe Leu
195 200 205

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210 215 220

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Asp Ile Val Gly Cys Asn Trp Leu Glu Leu Pro Ala Gly Lys Tyr Val
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Arg Arg Ala Glu Lys Lys Ala Thr Leu Cys Gln Leu Glu Val Asp Val
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Lys Gly Ile Phe Pro Glu Pro Glu Arg Asp Pro Val Ile Gln Ile Cys
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Ser Leu Gly Leu Arg Trp Gly Glu Pro Glu Pro Phe Leu Arg Leu Ala
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Leu Thr Leu Arg Pro Cys Ala Pro Ile Leu Gly Ala Lys Val Gln Ser
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Tyr Glu Arg Glu Glu Asp Leu Leu Gln Ala Trp Ala Asp Phe Ile Leu
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gcc atg gac cct gac gtg atc acc ggc tac aac att cag aac ttt gcc    1200
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Leu Pro Tyr Leu Ile Ser Arg Ala Gln Ala Leu Lys Val Asp Arg Phe
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Pro Phe Leu Gly Arg Val Thr Gly Leu Arg Ser Asn Ile Arg Asp Ser
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Ser Phe Gln Ser Arg Gln Val Gly Arg Arg Asp Ser Lys Val Ile Ser
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Gly Glu Gln Lys Glu Asp Val Gln His Ser Ile Ile Thr Asp Leu Gln
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Asp Ala Phe Leu Pro Leu Arg Leu Leu Glu Arg Leu Met Val Leu Val
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gag gac tac acg gga gcc aca gtc att gag ccc ctc aaa ggg tac tat     1776
Glu Asp Tyr Thr Gly Ala Thr Val Ile Glu Pro Leu Lys Gly Tyr Tyr
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Lys Gly Val Ala Ala Tyr Met Lys Ser Glu Asp Pro Leu Phe Val Leu
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Glu His Ser Leu Pro Ile Asp Thr Gln Tyr Tyr Leu Glu Gln Gln Leu
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gca gag tct gtg ctg ctg cgc ggt gac cac aca cga tgc aag act gtg   2976
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Cys Thr  Ser Arg Asp Cys Pro  Ile Phe Tyr Met Arg  Lys Lys Val
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cgc aag  gac ctg gaa gac cag  gaa cgg ctg ctg cag  cgc ttt gga      3294
Arg Lys  Asp Leu Glu Asp Gln  Glu Arg Leu Leu Gln  Arg Phe Gly
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Ala His Val Glu Leu Ala Glu Arg Met Arg Lys Arg Asp Pro Gly Ser
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gac ctt ggc aag tac tca gag gct aag agc aag ctt gat ttt gtg gaa     2623
Asp Leu Gly Lys Tyr Ser Glu Ala Lys Ser Lys Leu Asp Phe Val Glu
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Arg Thr Leu Arg Trp Arg His Leu Ala Pro Thr Ala Pro Asn Thr Leu
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Thr Asp Arg Asp Pro Phe Leu Ile Glu Thr Cys Pro His Val Tyr Phe
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Val Gly Asn Gln Asp Lys Tyr Asp Asn Arg Leu Ile Lys
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Cys Ile Pro Lys Phe Cys Glu Thr Gly Ile Ala Val Ala
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Ser Phe Ser Thr Gln Ile Asn Gln Ser
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Lys Val Leu Gly Leu Glu Lys Gly Lys Glu Cys Ile Ile Val Gly Thr
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Leu Phe Lys His Met Lys Leu Lys Pro Cys Val Leu Asp Glu Tyr Ser
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Lys Glu Arg Ser Val Thr Pro Leu Val Lys Pro His Asn Phe Met His
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Ala Gly Ser Ala Leu Ser Pro Ala Ile Tyr Val Thr Gly Val Val Val
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Ala Leu His Gly Lys Glu Thr Asn Ala Gly Glu Phe Phe Val Glu Asp
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Gln Glu Asp Lys Tyr Val Val Leu Leu Ser Gly Leu Cys Ile Gly Ser
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His Val Val Ile Ala Gly Asn Ser Phe Glu Phe Pro Arg Lys Leu Ile
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Thr Phe Arg Ser Cys Thr Asn Pro His Ser Phe Asp Val Asp Asn Ile
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Arg Phe Leu Gly Thr Ser Gly Gln Asn Ile Asp Asp Leu Gly Lys Tyr
325 330 335

Ser Glu Ala Lys Ser Lys Leu Asp Phe Val Glu Arg Thr Leu Arg Trp
340 345 350

Arg His Leu Ala Pro Thr Ala Pro Asn Thr Leu Gly Cys Tyr Pro Phe
355 360 365

Thr Asp Arg Asp Pro Phe Leu Ile Glu Thr Cys Pro His Val Tyr Phe
370 375 380

Val Gly Asn Gln Asp Lys Tyr Asp Asn Arg Leu Ile Lys Gly Ser Glu
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Gly Gln Leu Val Arg Leu Ile Cys Ile Pro Lys Phe Cys Glu Thr Gly
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Lys Gln Ser Asp Tyr Asn Ser Leu
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Trp Lys Ser His Leu Pro
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Phe Met His Pro Asp Asp Asn Leu Ile Leu Glu Asp Glu Ser Gly Arg
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Pro Gln Gln
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Pro Leu Asn Arg

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Cys Leu Phe Pro Gly Ser Ser Pro Tyr Asn Thr Phe Arg Ser Cys Thr
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Leu Leu Tyr Ser Leu Ala Pro Thr Trp Lys Ser His Leu Pro Val Cys
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Lys Val Leu Gly Leu Glu Lys Gly Lys Glu Cys Ile Ile Val Gly Thr
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Leu Phe Lys His Met Lys Leu Lys Pro Cys Val Leu Asp Glu Tyr Ser
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Lys Glu Arg Ser Val Thr Pro Leu Val Lys Pro His Asn Phe Met His
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Val Leu Glu Ala Gly Leu Pro Pro Gln Ile Glu Arg Pro Ile Asp Leu

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Gln Glu Asp Lys Tyr Val Val Leu Leu Ser Gly Leu Cys Ile Gly Ser
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Lys Ser Ala Asn Pro Leu Gln Phe Gln Leu Leu Val Asp His Ile Thr
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Ile Lys Glu Leu Asp Ile Met Leu Ser Gln Ile Ala Ala Gly Val Ser
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Thr Phe Arg Ser Cys Thr Asn Pro His Ser Phe Ala Val Asp Asn Ile
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Val Gly Asn Gln Asp Lys Tyr Asp Asn Arg Leu Ile Lys Gly Ser Glu
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Gly Gln Leu Val Arg Leu Ile Cys Ile Pro Lys Phe Cys Glu Thr Gly
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